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Town of Nantucket Sewer Department Capacity, Management, Operation and Maintenance (CMOM) Program Manual

Nantucket, Massachusetts
Updated March 2019

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Introduction

Sanitary sewer collection systems have a finite capacity to carry wastewater to a treatment facility. The system's capacity is based on the size of the system components and the flow they were designed to accommodate. Over time, the factors which influenced the systems basis of design may change for a variety of reasons. These factors can include population increase beyond the growth factor used in the design basis, deterioration of system's structural integrity resulting in an unacceptable inflow and infiltration (I/I) rate, and illicit stormwater connections, all of which result in flows in excess of the designed capacity. Such changes can lead to overflows from the system if the increased flows exceed the ability of the collection system or pump stations to transport the wastewater.

Failure to maintain the collection system can also result in overflows irrespective of any flow increase. Materials such as grease, rags, roots and other foreign objects can create blockages within the system which force wastewater to find alternate sources of relief. Overflows, regardless of the cause, release untreated sewage to surface waters, at times leading to substantial negative impacts on the receiving body. Sanitary sewage overflows (SSO's) have been known to contribute to environmental violations, fish kills and closures of recreational waters. Regular maintenance including inspection and cleaning regimens can minimize/eliminate these occurrences particularly those due to grease or sediment buildup and root development.

In order to comply with MassDEP Permit # 200-3, US EPA Region 1 AOC, and mitigate SSO's in their collection system, the Town of Nantucket, Massachusetts has developed the following Capacity, Management, Operation, and Maintenance (CMOM) Program that will result in enhanced collection system operation and reliability, as well as environmental compliance. This CMOM Program Manual outlines the Town's current and planned maintenance activities which will make up the CMOM program. This is the first version of the CMOM Program Manual, which is a working document. It will evolve as the Town continues to upgrade its collection system components, implement asset management programs and streamline operations. Ongoing modifications to this CMOM Program Manual will be submitted to Massachusetts Department of Environmental Protection (MassDEP) and the Environmental Protection Agency (EPA) on an annual basis.

The Town of Nantucket owns and operates two separate and distinct collection systems; the Town Collection System and the Siasconset Collection System. Flows from the Town collection system are conveyed to and treated at the Surfside Wastewater Collection Facility and flows from the Siasconset collection system are conveyed to and treated at the Siasconset Wastewater Treatment Facility. Both facilities are operated and maintained by the Town of Nantucket's Sewer Department. This CMOM Program Manual covers both collection systems, since they are both operated and maintained by the Town's Sewer Department.

1. System Overview

The Town of Nantucket owns and operates approximately 70 miles of sanitary sewer in two distinct collection systems: Town and Siasconset. Wastewater in the Town Collection System is conveyed to the Surfside Wastewater Treatment Facility and wastewater in the Siasconset Collection System is conveyed to the Siasconset Wastewater Treatment Facility. The Town's Comprehensive Wastewater Management Plant (CWMP) has determined other areas of the island for growth that could expand these collection systems or create new systems with alternative treatment. Currently, the Town is updating its CWMP for the Siasconset area of the Island which will also identify growth of the existing collection system.

The system includes gravity sewers, forcemains and pump stations. The collection system and wastewater treatment facilities serve the Town's year-round population of 15,000, as well as, the demands of the peak season population of approximately 100,000. Nantucket's collection system is separated. During CCTV (Closed Circuit Television) Inspections, any cross connections will be noted and reported in future updates to this Program Manual. The system consists of 1,302 manholes and pipes ranging in size from 8 inches in diameter to 30-inches in diameter. A variety of materials, including PVC, vitrified clay, reinforced concrete, asbestos cement, and HDPE, and cast iron make up the system. As part of the CCTV inspections, the pipe material and diameter will be updated in the Town's GIS database.

There are also 12 publicly owned pumping stations in the Town of Nantucket, with a thirteenth (13th) coming online in FY2018. Of the 12 pump stations, the largest is the Sea Street Pump Station, which is currently undergoing an upgrade to include a new SCADA system and larger pumps, as well as other items. There is one privately owned pump station in the Siasconset Sewer District, which conveys very little flow to the gravity portion of the system.

The Nantucket Harbor Shimmo and Plus Parcels Sewer Extension Project, nearing completion in March 2019, will add the following infrastructure to the collection system:

- 9,000 LF of new gravity sewer
- 4,000 LF of replacement gravity sewer
- 31,000 LF of new low-pressure sewer
- 5,000 LF of new forcemain sewer
- 1 new pump station (Wamasquid)
- 1 upgraded pump station (Monomy)

This project is discussed further in Section 1.1.

1.1 Town Collection System

The Town's primary WWTF, called Surfside, was constructed in the 1980s and upgraded in 2009. The Surfside WWTF provides biological treatment to a daily flow of up to 7.7 MGD. The Town Collection System consists of approximately 60 miles of gravity sewer, 12.4 miles of force main and 15 pump

stations. Sea Street Pump Station is the largest pump station on the Island and conveys 85 percent of the Town's flow to the Surfside WWTF.

The Nantucket Harbor Shimmo and Plus Parcels Sewer Extension Project, nearing completion in March 2019, will add the following infrastructure to the collection system:

- 9,000 LF of new gravity sewer
- 4,000 LF of replacement gravity sewer
- 31,000 LF of new low-pressure sewer
- 5,000 LF of new forcemain sewer
- 1 new pump station (Wamasquid)
- 1 upgraded pump station (Monomoy South)

This project will provide service to properties in the Shimmo, Meadow View Drive, Bayberry Lane, Tashama/Maclean Lane, and Green Meadows Drive neighborhoods via gravity and low-pressure sewer. To convey flow to the Town Sewer District, one new pump station will be installed on Wamasquid Drive and the Monomoy South Pump Station will be upgraded to accommodate additional flow. The new pump stations are discussed in further detail in Section 4.

Flow will be conveyed through the low-pressure sewer via grinder pumps, which will be provided to homeowners via the construction contract. As is the standard policy on the island, the NSD does not own, operate, or maintain the grinder pumps on private property.

Table 1-1 Town Sewer District Data

Treatment Facility Name	Surfside Wastewater Treatment Facility
Peak Design Capacity	7.7 MGD
Average Daily Design Flow	4.0 MGD (April-Oct) Tourist Season
	1.1 MGD (Nov- March) Off-Season
Percentage of Combined Sewer	UNK
Miles of Gravity Sewers	60 (additional 1.7 miles coming in FY 2018)
Miles of Force Mains	12.4 (additional 0.95 miles coming FY2018)
Number of Pump Stations	14 (includes new Wamasquid PS to be added in 2018)
Number of Manholes	1,168

Figure 1-1 Illustrates the Town's sewer collection system.

1.2 Siasconset Collection System

A second, smaller WWTF was built to treat flow from the Siasconset Sewer District. The treated effluent is discharged to infiltration sand beds at Low Beach. This second WWTF came online in 2004 and treats a daily flow of up to 0.43 MGD. This plant experiences fluctuations in flow dependent on wet weather events and seasonal population changes. Average Day Flows can range from approximately 10,000 GPD

to nearly 400,000 GPD. The Siasconset Collection System consists of about 8.81 miles of gravity sewer owned and operated by the NSD (Nantucket Sewer Department). The collection system also has one privately owned pump station and 0.35 miles of privately owned forcemain.

Table 1-2 Siasconset Sewer District Data

Treatment Facility Name	Siasconset Wastewater Treatment Facility
Peak Design Capacity	0.43 MGD
Average Daily Design Flow	0.055 MGD (April – October) Tourist Season 0.010 MGD (Nov – March) Off Season
Percentage of Combined Sewer	UNK
Miles of Gravity Sewers ¹	8.81
Miles of Force Mains ¹	0.35
Number of Pump Stations	1 (privately owned and operated)
Number of Manholes ²	134

Figure 1-2 illustrates Siasconset’s sewer collection system.



0 5 10 20 Miles

Figure 1-1 Town Sewer Collection System

Hazen



0 5 10 20 Miles

Figure 1-2 Siasconset Sewer Collection System



2. Collection System Management

2.1 Goals

The Town of Nantucket has developed this Operation and Maintenance (O&M) Program Manual to document the ideas, concepts, Best Management Practices and procedures used to enhance the efficiency and reliability of the Town's collection system. The goals of the plan are to:

- Prevent sanitary sewer overflows (SSO's) to the greatest extent practicable
- Organize the Town's personnel and equipment through a regular collection system maintenance program and SSO emergency response plan
- Develop a system to assess and prioritize maintenance, rehabilitation and replacement activities for the collection system
- Ensure the efficient, economic, environmentally sound transport of wastewater to the Town's wastewater treatment facilities
- Ensure environmental compliance
- Prevent the interruption of wastewater transport service
- Transition from reactive to preventative maintenance activities

2.2 Organizational Structure

The operation and maintenance of the Town of Nantucket's Wastewater Treatment Facilities (WWTFs) and wastewater collection system falls under the responsibility of the newly founded Nantucket Sewer Department (NSD). The NSD was recently created, having become official on November 14, 2016 and opened the Department's Office on April 10, 2017. The NSD has plans to hire additional administrative staff in FY 19.

The NSD employs 17 full-time employees responsible for the operation and maintenance activities related to the Town's WWTF, collection system, and remote facilities. In 2018, a staff engineer, and two new operators were hired, as well as an office administrator. The NSD also saw a change in the Chief Operator position in 2018 when Kevin Manning was appointed to the position.

The NSD and the Town's Human Resource Department is currently writing new job descriptions for NSD positions as previously all sewer staff reported to the Department of Public Works Director. Job descriptions will be updated in subsequent manual updates. The following are current staff descriptions:

- Sewer Director - Plans and supervises the review of the design, permitting, construction, and maintenance of municipal wastewater facilities and properties as well as projects proposed to the town and town boards and committees as directed. The Director reports directly to the Town Manager.

- Chief Operator – Responsible for all phases of treatment plant operations at both treatment plants to ensure that the DEP discharge permits are met. The chief operator reports to the Sewer Director.
- Assistant Chief/Chief Mechanic – Assistant Chief/Chief Mechanic is capable of assuming responsibilities of the chief operator in his absence. The Assistant Chief Operator reports to the Chief Operator. The chief operator reports to the Sewer Director.
- Lead Operator – Lead operator at the Siasconset Wastewater Treatment Facility and capable of assuming responsibilities of the chief operator in his absence. The Lead Operator reports to the Chief Operator.
- Laboratory Manager – Responsible for all sampling and the analysis at the Surfside WWTF as well as the analysis at the Siasconset WWTF that are performed in the surfside laboratory. Responsible for all maintenance and quality assurance and quality control pertaining to the lab. Required to provide selective samples to be tested off-island by a certified lab for QA/QC purposes. Recommends needed daily processes and changes for both facilities, and responsible for implementing such changes. The Lab Manager reports to the Chief Operator and Sewer Director.
- Mechanics – Responsible for all preventative and corrective maintenance at both facilities and the pump stations. These personnel should hold wastewater licenses and be capable of operation both facilities. The Mechanics report to the Chief Operator.
- Working Foreman Operators – Supervise and work with plant staff to ensure proper operation of both facilities. Responsibilities include monitoring pump station operations, monitoring and performing all duties associated with primary and secondary treatment under the supervision of the chief operator, maintain rapid infiltration beds at both facilities, maintain grounds and buildings both inside and out as well as assisting the Lead Operator with any functions needed at Siasconset WWTF. Working Foremen report to the Chief Operator.
- Operators – Work with plant staff to ensure proper operation of both facilities. Responsibilities include monitoring pump station operations, monitoring and performing all duties associated with primary and secondary treatment under the supervision of the chief operator, maintain rapid infiltration beds at both facilities, maintain grounds and buildings both inside and out as well as assisting the Lead Operator with any functions needed at Siasconset WWTF.
- Collections Operators – Responsible for all preventative and corrective maintenance for all sanitary sewer collections systems. These Operators are required to obtain a NEWEA Collections Certification Grade III and Massachusetts Grade 4M or 6C wastewater license. The Collections Operators report to the Chief Operator.

The NSD Organizational structure is depicted in Figure 2-1. Please note the following changes to the organizational structure, which will be reflected in a new organizational chart at a later date:

- Chief Operator is now Kevin Manning, no longer Ardis Gary
- Engineer, Office Administrator, 2 operator positions were filled

Town&County of Nantucket Organization Chart - Sewer Department

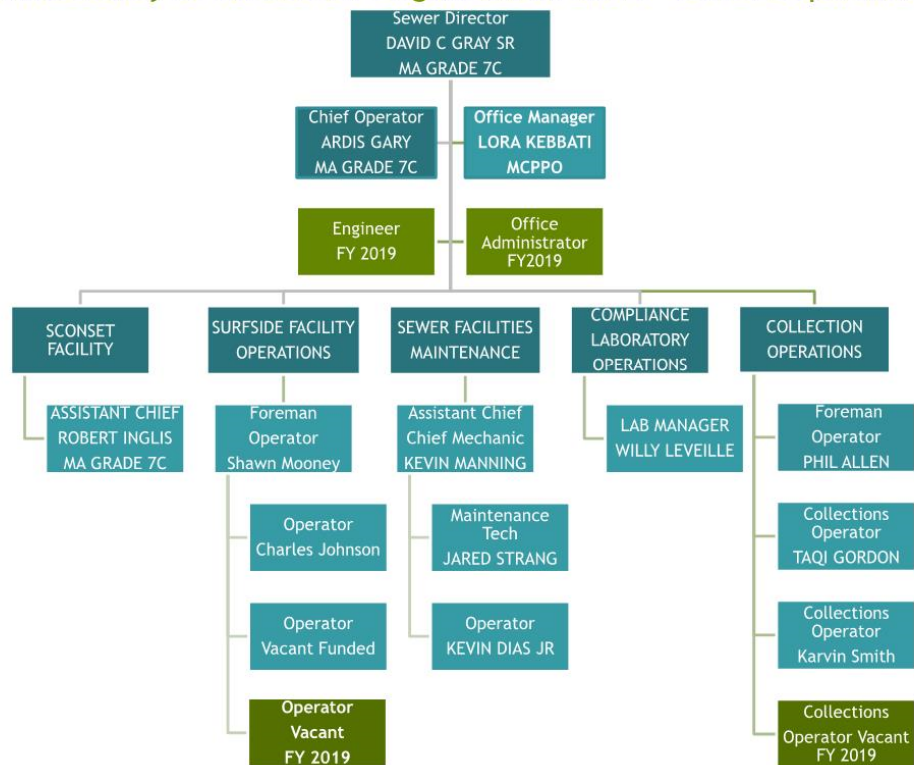


Figure 2-1 Nantucket Sewer Department Organizational Chart

2.3 Training

The NSD provides various training programs to its staff including but not limited to:

- Electronic data collection and GIS updating
- Prioritizing collection system maintenance
- Pipeline and pump station preventative maintenance
- Work order processing and completion activities and applicable Asset Management criteria
- Management reporting
- Implementation of Emergency Overflow Response Plan

- FOG inspection protocol and follow-up
- Key components of the overall O&M Plan
- Work zone traffic safety
- Lockout/Tagout (LOTO) Procedures
- Confined Space Entry
- OSHA 10
- Confined Space Entry
- Lockout/Tagout Procedures
- PACP/MACP Training (via NASSCO)
- NEWEA Collection Class
- Operator Certification
- CDL
- Hoisting Licensure
- Oil Spill Prevention
- Lab Training

The Department Administrator is responsible for maintaining records of trainings completed by employees and expirations of certifications. All trained staff are required to sign off to document attendance and understanding of the training topics.

The NSD has collection system employees with the following NEWEA certifications:

- (6) Grade three
- (3) Grade two

The Town contracted with Tilson & Associates, LLC, of Torrington, CT. Tilson and Associates is a consulting firm specializing in wastewater collection systems operation. In October 2017 Tilson and Associates performed an assessment of NSD collection system maintenance focusing on pipe cleaning and safety. In 2019, the NSD intends to contract with Tilson & Associates again provide additional training to ensure more effective and efficient use of equipment and a more thorough understanding of maintenance procedures for the staff.

In addition to documentation of training, several Standard Operating Procedures (SOPs) are already in print and accessible to Department staff, with plans to create several more SOPs in the near future as a result of Tilson and Associate's assessment.

2.4 Internal Communications and Customer Service

Complaints and customer requests are received primarily by phone calls, emails, and occasionally in person at the Sewer Department. The NSD Administrator receives all complaints and requests and directs them to appropriate staff for required action via a routing/tracking system. Work Orders are generated to prompt further investigation and include the following detailed information about the complaint/request:

- Receiver of complaint
- Time and date of complaint/request
- Complainant information (Name, address, call back phone number)
- Location of the problem
- Type of complaint (e.g. home back up, odor, manhole overflow, etc.)
- Description of Work
- Personnel assigned to complaint
- Findings type, including cause of problem
- Complaint closeout information
- Date complaint closed

Once a complaint is assigned and work order generated, NSD personnel perform an investigation. If the problem cannot be immediately resolved, the responding staff will initiate steps to take appropriate action for permanent correction of the problem. In the event that the Town of Nantucket is not responsible for correcting the problem, a designated staff member will provide the complainant with guidance on a recommended course of action. Once an investigation has been completed, the staff prepares closeout information for filing. The Sewer Department's administrator maintains records of all work orders and complaints/inquiries. Examples of the tracking system for different sewer-related complaints are included in Appendix A.

Additional customer services is accomplished through community outreach. The Town of Nantucket Sewer Department delivers presentations in an effort to educate the community on what not to flush, education on fats, oils and grease. The Town delivers presentations to the local groups such as schools, Town Officials, media, community groups such as the Nantucket Boys Club, and private citizens. The NSD distributes brochures regarding FOG and is working towards developing a formal FOG plan in 2019.

2.5 Geographic Information Systems (GIS)

The Town of Nantucket has a centralized Geographic Information System (GIS) database utilizing associated software from ESRI. The Town maintains their licenses and database through the Information Technology and GIS Department. The Town uses the GIS as a resource for decision making for various

departments including the NSD. The Information Technology and GIS Department employs 6 people, including 1 full time GIS coordinator.

The Town's collection systems are mapped in the GIS database. The database includes gravity mains, force mains, low-pressure sewer, and sewer manholes. The system can be updated to include new pipes should the collection systems experience future expansion. Figure 2-2 illustrates the Town's GIS system and user interface through the web application. To preserve clarity, only a small portion of the Town area is displayed in Figure 2-2 and feature labels have been turned off. There is also a desktop version of the software and a mobile application, all with similar capabilities and access to the same, online database.

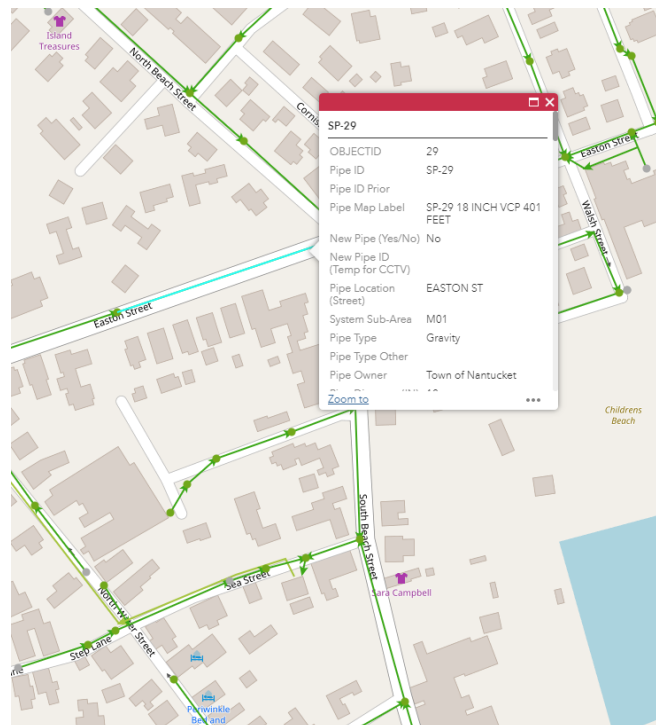


Figure 2-2 Nantucket GIS Screenshot

Nantucket Sewer Department has been using PeopleGIS on tablets in order to manage and view data in the field. This software application allows the NSD staff to find and make changes to the data in the On-line GIS. The Town approved \$25,000 on February 22, 2017 for new software.

In 2017, the Town began using ArcGIS Online (AGO), which is an ESRI product. AGO is compatible with a mobile app, Collector, which allows for field use on smartphones and tablets. The implementation of AGO is allowing the Town to move away from the grid system, but the Town still maintains references to the original grids, including fields in attribute tables that link each asset back to its original grid-based ID.

The Town is continuing to make strides to update their protocols and system, with intentions to continue this effort throughout the CMOM Program. New policies/protocols are currently being developed by the Sewer Director and will be reported in CMOM Program Manual updates.

2.6 Management Information Systems

2.6.1 Work Orders

The NSD has a customized MIS system for work orders. The work order system has been developed internally with electronic files for the following categories:

- Sewer System Issues
- Suspect Violations
- Manhole Repairs

The work order files are filed and organized by the NSD administrator as are the customer service orders which are discussed further in Section 2.4 Internal Communications and Customer Service.

2.6.2 Collection System Data

NSD manages collection system data with the use of SCADA and RTU for pump stations, ETM and alarms. All functions and operations are monitored with IFIX Proficy and Historian software. In 2016, a new SCADA system and applicable computers were installed.

The NSD has received a proposal for the use of PeopleGIS for their SimpliCity Online Permitting Services. This software will provide NSD with a web-based permit tracking system for new service connections into their collection systems. This process will be discussed in further detail in Section 3.6 Engineering and Construction.

2.6.3 Asset Management

The Town currently uses GASB compliant software (Softright Software) for overall asset management. During February 2019, the NSD began the process of selecting a new Computerized Maintenance Management Software (CMMS) with the assistance of Hazen and Sawyer. This process is ongoing and updates will be provided in subsequent CMOM submittals.

2.7 Management of Sanitary Sewer Overflows (SSOs)

The Town and Siasconset Sewer Systems are both separated systems and do not typically have issues with sanitary sewer overflows. The collection systems have overflowed in the past due to root intrusion, wipes/obstructions, and FOG (fats, oil and grease). The Town Sewer District has experienced less than 20 SSOs in the last three years with many of those occurring due to root intrusion, with approximately 1/3 of backups occurring in basements. The Siasconset Sewer District has had less than 6 SSOs over the last three years resulting in 2 basement backups.

The NSD will be implementing a root control program as part of this CMOM program, via information gathered during the CCTV inspections. During 2017, a SERECO 800 HPR jetting truck was added to the NSD's inventory. This truck has the ability to spray root inhibitors as well and will be integral in implementing a root control program in the future.

All SSOs are documented using the Massachusetts State SSO Form and filed with the State within 24 hours, most within one hour via telephone, followed by electronic communication and fax (per MADEP regulations). See Appendix B for the SSO Form.

NSD have developed the following measures to mitigate overflows:

- Daily checks of consistent problem areas.
- Weekly cleaning of problems found.
- Public outreach regarding FOG and non-flushables.
- Root control plan to eliminate blockages.

Long term, the NSD will identify potential problem areas via the CCTV Inspection Program. This inspection program will inspect every pipe in the Town and Siasconset Sewer Districts over the next three years. The CCTV inspection program will identify issues with blockages, roots, and structural and operational pipe defects. Under CMOM, the CCTV inspection program combined with an I/I evaluation and capacity analysis will provide the NSD with a proactive way of identifying issues that could cause SSOs. The Town will budget for annual improvements to the collection systems based on these CMOM programs.

2.8 Legal Authority

The Nantucket Board of Health (BOH) maintains sewer use regulations including FOG. The BOH and NSD work closely and coordinate efforts related to legal authority. Furthermore, the Board of Selectmen and the Sewer Commission work with the BOH and NSD to enforce the sewer use ordinances. Any person or organization proposing an addition of a property that would require a sewer connection is required to complete a check list with signature that requires evaluation and approval from the BOH, Sewer Commissioners, Planning Office and Wannacomet Water. A rating system is used which determines whether an applicant will be allowed to tie into the collection system. The rating system is based on the following: failed septic system, land use, wellhead protection zone, other special circumstances. In addition, the applicant needs final approval from the NSD. The NSD requires an Application for Permit for Sewer System Extension, Connection, or Industrial Wastewater. The Checklist for Proposed Expansion of the Sewer District is located in Appendix C. and the Application for Permit for Sewer Extension is attached as Appendix D.

The sewer and storm water regulations are in the process of being updated as part of the on-going Nantucket Harbor Shimmo and Plus Parcels Sewer Extension project and these will be included in subsequent CMOM submittals. The updated sewer regulations and standard specifications were prepared in 2018 and will be presented to the Board of Selectmen for review in April 2019.

2.9 Budgeting

The Town of Nantucket Sewer Department has an enterprise fund established for costs associated with operating and maintaining the sewer collection system and wastewater treatment facilities. Currently, sewer rates are calculated based on water usage and evaluated yearly. The Town is the process of

completing a rate study analysis and is working to determine how revised sewer rates will be applied. Updates will be included in subsequent CMOM submittals.

Budgeting for improvements are prioritized through the Town's Comprehensive Wastewater Management Plan (CWMP) prepared in 2014. The Town is planning to develop a separate CWMP for the Siasconset Sewer District. The Town and Siasconset Sewer District's budgets are separate. Projected annual average budget for both is \$1,500,000.

3. Collection System Operation

3.1 Hydrogen Sulfide Monitoring and Control

There are no frequent odor complaints about the collection system. Hydrogen sulfide monitoring and control is performed by NSD staff with biannual inspections of the force mains and quarterly exercise of air relief valves.

3.2 Safety

The Nantucket Sewer Department maintains safety equipment for various situations that arise with operating and maintaining collection systems. The following Table identifies current safety equipment owned by the Town and the location the equipment is stored.

Table 3-1 Safety Equipment Inventory

Item	Unit	Existing Inventory	Suggested Inventory	Comments
PPE - Hard Hats	EA	15	25	Available with Crews and in Buildings 2 & 4
PPE - Safety Vests	EA	36	36	Available with Crews and in Buildings 2 & 4
PPE - Safety Glasses (tinted)	EA	72	12	Available in Building 4
PPE - Latex Gloves	CASE	2.5	4	Available in Building 4
PPE - Rubber Waders	PR	0	1	N/A
PPE - Hearing Protection	BOX	1/8	1	Available in Building 2, Safety Equipment Cabinet
PPE - Tyvek Suits	CASE	3	3	Available in Building 4 Control Room
PPE - Personal PPE Kit Bag	EA	0	15	Individual safety bags
First Aid Kits	EA	4	4	Available in Buildings 4, 5, Lab, and Admin
Life Rings	EA	3	3	Primary & Advanced Treatment Buildings
Fall Protection – Harness	EA	3	3	Available in Building 2
Fall Protection - Tripod & Winch System	EA	1	2	Available in Building 2
MH Ventilation - Blower and Duct Comb.	EA	3	3	Available in Building 2
MH Ventilation - 4-Gas Meter	EA	2	2	Available in Building 7 (Shop)
SDS Storage Box	EA	5	5	Available at WWTP
Flammable Liquid Cabinet	EA	5	5	Available throughout WWTP
Plastic Safety Chains	LF	300	300	Available in Building 5
36-inch Black and Yellow Posts	EA	9	9	Available in Building 5
Traffic Control - Large Traffic Cones	EA	6	10	Available on Trucks
Traffic Control - Traffic Paddles	EA	0	5	N/A
Traffic Control - Flash Board/Message/Arrow	EA	1	1	Available with Sewer Department

3.3 Mapping

3.3.1 GIS Mapping

The Town's collection systems are mapped in a GIS database. The prior system utilized a tile-based system where manhole IDs were numbered based on the sewer tile numbers and the number of sewer manholes in that tile. Beginning in 2017, the NSD adopted the use of ArcGIS Online (AGO), produced by ESRI. AGO is a web-based platform, storing GIS data securely on ESRI servers and allowing access to this data via web applications, mobile applications, and traditional desktop software. This system has allowed the NSD to abandon the tile numbering, although references are still maintained for manhole IDs. Sewer pipes IDs are numbered sequentially. The sewer pipe layer includes more than 80 attribute fields, which provide the ability to track pipe ID, diameter, length, material, condition (based on PACP coding),

rehabilitation recommendations, and many more items. The sewer manhole layer has similar fields, allowing the NSD to record information such as manhole ID, depth, location, rim elevations, condition (based on MACP coding), rehabilitation recommendations, and more. The attribute fields are fully customizable and can be changed at any time by an authorized GIS user.

GIS maps have been updated with GIS work to date as well as CCTV data from the Town's 2005 Infiltration and Inflow Reports. The Town undertook a GIS update in 2012. Additional updates began in Fall 2017 as part of the CMOM Program. Beginning in the Fall of 2017, the NSD has started using AGO as a means of tracking CCTV reviews and streamlining the GIS update process. The use of AGO is discussed in Section 2.5.

CCTV work is being conducted by a combination of the Town's sewer department staff and a hired contractor. As part of this work, the CCTV crews have been given access to an AGO Web App, which allows them to make maps for their use when performing CCTV inspections. The Web App also allows the crew to make note of any discrepancies between the Town's original GIS data and actual field conditions. Those discrepancies are reviewed by the Town's Consultant and the Sewer Director for QA/QC and authorization to revise the GIS maps.

Nantucket Sewer Department was using PeopleGIS on tablets in order to manage and view data in the field. The department is now making use of the ESRI Collector App on tablets and smartphones to access their AGO maps in the field. This mobile software application allows the NSD staff to find and make changes to the data in the online GIS database while they are in the field. In addition, edits to the GIS maps are being made during field work performed as part of the CMOM Program. As the NSD continues the CMOM program, field work will be conducted annually which will provide information necessary to make changes to the collection system GIS maps. Both CCTV and flow monitoring will be conducted regularly to identify changes in the GIS maps, which will be updated accordingly.

3.3.2 Record Plans

The Town collects and maintains sewer system Record Drawings on the Town's computer network. All drawings are stored electronically with minimal hard copies on site at the Surfside Wastewater Treatment Facility. The Town has a new process for collecting Record Plans from developers and contractors through the use of PeopleGIS software. This software will provide NSD with a web-based permit tracking system for new service connections into their collection systems. This process will be discussed in further detail in Section 3.4 Engineering and Construction.

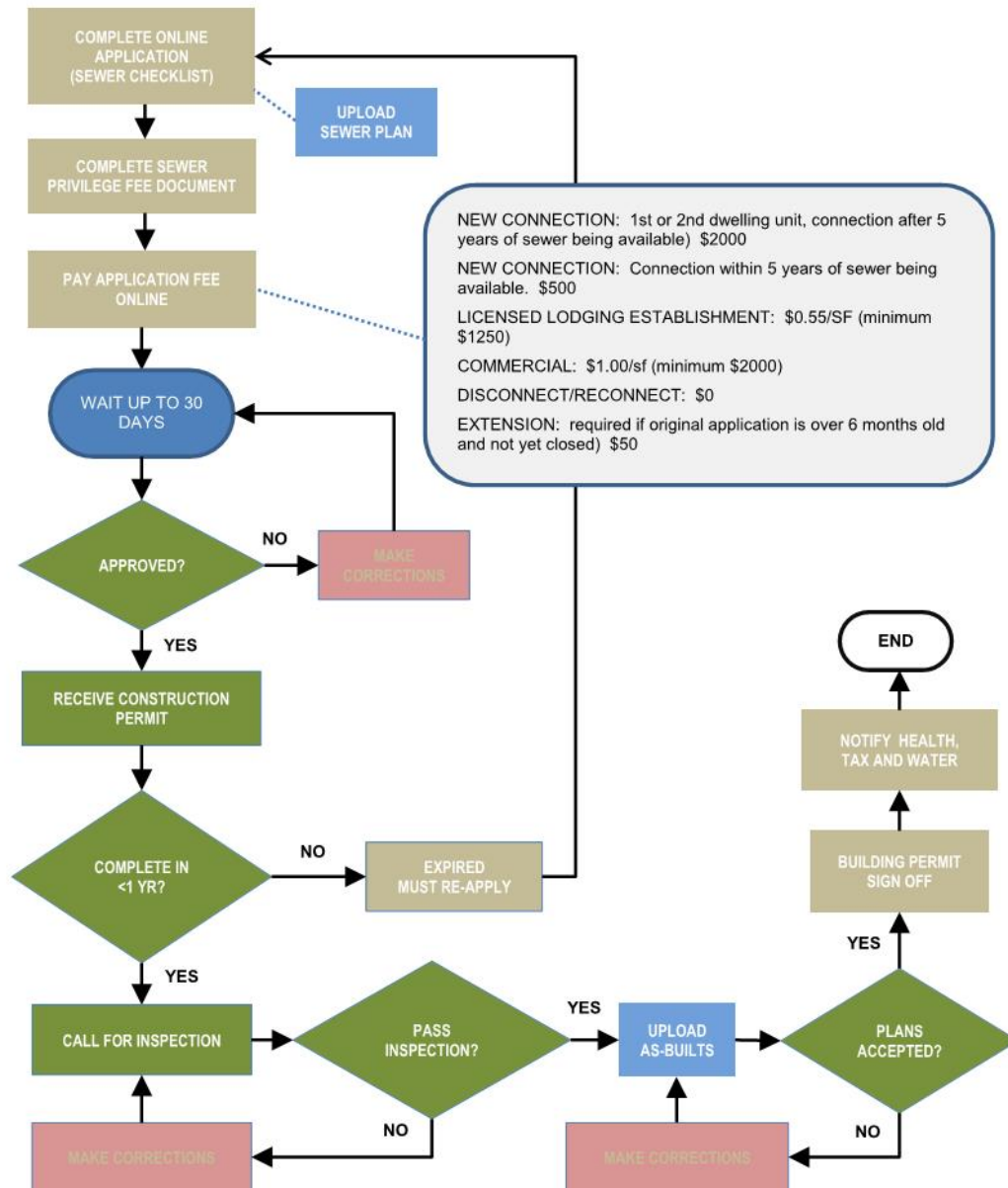
3.4 Engineering and Construction

Any person or organization proposing to addition of a property that would require a sewer connection is required to complete a check list with signature that requires evaluation and approval from the BOH, Sewer Commissioners, Planning Office and Wannacomet Water. A rating system is used which determines whether an applicant will be allowed to tie into the collection system. The rating system is based on the following: failed septic system, land use, wellhead protection zone, other special circumstances. In addition, the applicant needs final approval from the NSD. The NSD requires an Application for Permit for Sewer System Extension, Connection, or Industrial Wastewater. The Checklist

for Proposed Expansion of the Sewer District is located in Appendix C. and the Application for Permit for Sewer Extension is attached as Appendix D. The Town employs a flat fee for sewer hook-up of \$2,000.

Once a new service or extension is approved the NSD plans to use PeopleGIS software to track installation, approve installation and update the Town's GIS. The Town also will use this software for collecting Record Plans from developers and contractors. This software will provide NSD with a web-based permit tracking system for new service connections into their collection systems. The proposed process is in Figure 3-1.

Figure 3-1 Sewer Extension/Connection Permitting Process



4. Pump Stations

The Town of Nantucket owns and operates 15 wastewater pump stations listed in Table 4.1. The pump stations are routinely checked by NSD staff and records kept on location.

Table 4-1 Pump Stations Maintained by NSD

Pump Station	Location
Airport Pump Station	1 Millers Way
South Valley Pump Station	95 Goldfinch Drive
Monomoy South Pump Station ¹	19 Monomoy Road
Monomoy North Pump Station	61 Monomoy Road
Cato Lane Pump Station	21 Cato Lane
Aurora Way Pump Station	3 Aurora Way
Pine Valley Pump Station	27 Keel Lane
Surfside Rd Pump Station	95 Surfside Road
Sachems Path Pump Station	Nanina Drive
Sherburne Commons Pump Station	Sherburne Commons
Abrem Quarry Pump Station	5 Blueberry Lane
Sea Street Pump Station	1 Sea Street
115 Washington Street Pump Station ²	115 Washington Street
Backus Lane Pump Station ³	Backus Lane
Wamasquid Pump Station (New FY 2018)	Wamasquid Place

1. This pump station is being upgraded as part of the Shimmo project
2. This pump station was removed from service in January 2018
3. This pump station has been adopted by the NSD

In most cases, manufacturer's Operation and Maintenance (O&M) manuals for equipment readily accessible to Sewer Department Staff. Each pump station also has an emergency operating procedure developed for it. Several pump stations have Supervisory Control and Data Acquisition (SCADA) systems installed and all pump stations have alarm systems. Tables 4-2 through 4-13 shows the equipment housed at the pump stations currently and will be updated accordingly as upgrades are completed. The accompanying figures show the pump stations from the ground and a simple map of their location.

The Wamasquid Pump Station will come online in fiscal year 2018 as part of the Nantucket Harbor Shimmo and Plus Parcels Sewer Extension Project. This pump station will operate 2, non-clog, submersible pumps in a lead/lag configuration. The pump station has a design capacity of 130 gallons per minute (gpm) and a total dynamic head (TDH) of 84 feet. The motors shall be 460 volt, 3 phase, with a maximum horsepower of 15, and a maximum RPM of 1,750. The pump station will service the Meadows View Drive neighborhood, which is located off of Vesper Lane.

4.1 Pump Station Locations and Equipment



Figure 4-1 Airport Road Pump Station Site Location

Table 4-2 Airport Rd Pump Station Equipment

Equipment	Number	Notes
Pumps	2	270 gpm pumps
Motors	2	1775 rpm, 15 HP, 480 V, 3 Ph, 60 Hz
Control Panel	1	Combination Control & Power Panel
Float Switches	5	
Alternate Power Sources	0	NSD brings generators to site as needed



Figure 4-2 South Valley Pump Station Site Location

Table 4-3 South Valley Pump Station

Equipment	Number	Notes
Pumps	3	Gorman-Rupp T-series, T6A3-B 1,000 GPM, TDH 38.5 ft
Motors	3	
Control Panel	1	Allen-Bradley, RTU
Float Switches	5	
Meters	1	Flow Meter



Figure 4-3 Monomoy South Pump Station Site Location

Table 4-4 Monomoy South Pump Station (Upgraded 2018)

Equipment	Number	Notes
Pumps	2	Flygt Pumps, 275-700 gpm (new 2018)
Motors	2	1,750 rpm (max, VFDs), 30 HP, 460 V, 3 Ph
Control Panel	1	Combination Control & Power Panel
Float Switches	1	1 backup high level float, pressure transducer for regular operation
Alternate Power Sources	1	Emergency Propane Generator on site



Figure 4-4 Monomoy North Pump Station Location

Table 4-5 Monomoy North Pump Station

Equipment	Number	Notes
Pumps	2	Flygt Pumps, 140 gpm
Motors	2	VFDs
Control Panel	1	Combination Control & Power Panel
Float Switches	5	
Alternate Power Sources	0	NSD brings generators to site as needed



Figure 4-5 Cato Lane Pump Station Site Location

Table 4-6 Cato Lane Pump Station

Equipment	Number	Notes
Pumps	2	Flygt Pumps, 140 gpm
Motors	2	VFDs
Control Panel	1	Combination Control & Power Panel
Float Switches	5	
Alternate Power Sources	0	NSD brings generators to site as needed

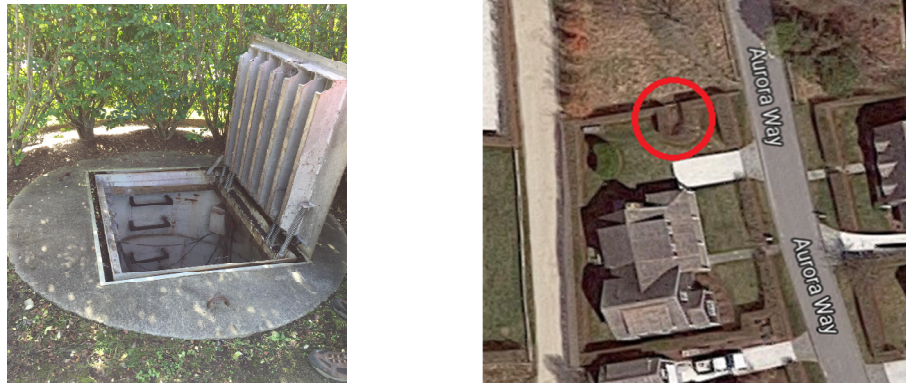


Figure 4-6 Aurora Way Pump Station Site Location

Table 4-7 Aurora Way Pump Station

Equipment	Number	Notes
Pumps	2	24 gpm
Motors	2	
Control Panel	1	Combination Control & Power Panel Mission Control Monitoring System
Float Switches	5	
Alternate Power Sources	1	NSD brings generators to site as needed



Figure 4-7 Pine Valley Pump Station Site Location

Table 4-8 Pine Valley Pump Station

Equipment	Number	Notes
Pumps	2	24 gpm
Motors	2	
Control Panel	1	Combination Control & Power Panel Mission Control Monitoring System
Float Switches	5	
Alternate Power Sources	1	NSD brings generators to site as needed



Figure 4-8 Surfside Road Pump Station Site Location

Table 4-9 Surfside Road Pump Station

Equipment	Number	Notes
Pumps	2	Gorman-Rupp, 900 gpm
Motors	2	
Control Panel	1	Allen-Bradley, 460 Volts RTU
Float Switches	5	
Meters	1	Flow meter



Figure 4-9 Sachems Path Pump Station Site Location

Table 4-10 Sachems Path Pump Station

Equipment	Number	Notes
Pumps	2	100 gpm
Motors	2	
Control Panel	1	
Float Switches	5	
Odor Control	1	Chemical Dosing and Carbon Filter



Figure 4-10 Sherburne Commons Pump Station Site Location

Table 4-11 Sherburne Commons Pump Station

Equipment	Number	Notes
Pumps	2	Myers Pumps, 313 gpm
Control Panel	1	Myers Control Panel
Float Switches	5	
Odor Control	1	Carbon Filter
Alternate Power Sources	0	NSD brings generators to site as needed



Figure 4-11 Abrem Quarry Pump Station Site Location

Table 4-12 Abrem Quarry Pump Station

Equipment	Number	Notes
Pumps	2	Myers Pumps, 140 gpm
Motors	2	5 HP
Control Panel	1	Allen-Bradley MicroLogix 1500
Float Switches	5	
Alternate Power Sources	0	NSD brings generators to site as needed



Figure 4-12 Sea Street Pump Station Site Location

Table 4-13 Sea Street Pump Station

Equipment*	Number	Notes
Pumps	3	1,500 gpm
Motors	3	85 HP, 460 V, 3 Phase, 60 Hz, 1800 RPM
Control Panel	1	SCADA Integration
Float Switches	5	
Alternate Power Sources	1	300 KW, 480 V, Diesel Generator
* This pump station is currently being upgraded to the specifications listed		

4.2 Pump Station Alarms

The Town's pump station alarms vary depending on the size and criticality of the pump station. The following is a list of typical alarms at pump stations throughout the Town:

- High Level Wet Well
- Low Level Wet Well
- Power Failure
- Overflow
- Pump Failure

Having the ability to monitor the pump station operation remotely and receive alarms which identify specific issues allows Sewer Department staff to better address maintenance issues and alarms as they arise.

4.3 Pump Station Inspections

The Nantucket pump stations are, on average, inspected daily by Sewer Department Staff. During these inspections, Town staff reviews and records pertinent information that may include pump run hours, totalized flow, wet well levels and alarms, depending on the station and its equipment. Back-up generators are inspected monthly by Sewer Department staff, and exercised with load every other month by Sewer Department Staff.

Inspection, maintenance and repairs are recorded and kept accessible to the Sewer Department at the Administration building at the Surfside WWTF. If a problem or maintenance issue is encountered, personnel must also report it immediately to the appropriate supervisor for resolution. The supervisor will initiate the generation of applicable work orders for repairs and routine maintenance. Repairs are a higher priority than routine maintenance.

The Town had one pump station with piping and valve issues with a wet well failure in 2015. This station was fully repaired in 2015. Sea Street Pump Station is undergoing a complete renovation with upgrades to the pumps, piping, electrical, SCADA and a new emergency generator and flood protection. This upgrade will be completed in 2018.

One forcemain failure occurred in January 2018, which required extensive cleanup and repair efforts. This failure occurred on one of the forcemains leaving the Sea Street Pump Station, in the vicinity of 7 South Beach Street and was addressed by the NSD in accordance with all state and federal regulations. During the time that the forcemain was offline, the NSD inspected the remainder of the failed forcemain. The forcemain was repaired and became operational again during early 2018. Planning for the construction of a new forcemain is underway at this time.

4.4 Mechanical and Electrical Maintenance

The size of the pump station and its related equipment determine its specific mechanical and electrical maintenance needs. The Collections System Operators are responsible for incorporating the routine preventative maintenance of each pump station into the current filing system. The Collections System Operators use manufacturers' Operation and Maintenance manuals to establish action items for pump station equipment. The CMOM Program will develop a system for prioritization of equipment maintenance needs. Currently, work orders are back logged and the Sewer Department Staff is working through them as quickly as possible. Preventative maintenance is currently carried out on a bi-annual basis. The current 6-month preventative maintenance regime includes:

- Change oil and grease bearings on pumps and generators
- Adjust pumps
- Rotate Pumps (lead, lag, backup)
- Maintain intake air filters (where applicable)
- Wet-well cleaning (as necessary)

Generally, mechanical and HVAC repairs for the pump stations are performed by Sewer Department staff. The Town does not keep a large inventory of spare parts for their pump stations, but has identified suppliers so that parts are readily obtained from local vendors or the manufacturer's service center. The stations' electrical maintenance needs are contracted out on an as needed basis.

Whether repairs are made by contractors or by Sewer Department employees, all mechanical and electrical maintenance activities are recorded on log sheets. As the Town works to select and implement a Computerized Maintenance Management System (CMMS), these records will be uploaded to that database. The Sewer Department's administrator generates work orders for preventive maintenance actions. Any problems or maintenance issues noted by crews are reported to the administrator to begin the work order process, which will lead to a timely resolution to the problem.

4.5 Forcemain Maintenance

Nantucket currently operates a total of 12.7 miles of forcemain in the collection system. The system contains several air relief valves at the high points. Nantucket Sewer Department staff performs routine maintenance and inspection on these valves quarterly. Air relief valves and valve vaults are inspected for signs of corrosion, connection point leakage, or improper operating characteristics. The Town will develop a forcemain cleaning protocol as part of the CMOM Program. There has been one forcemain failure, which was addressed in Section 4.3.

An additional 5,000 LF of forcemain is expected to come online during 2019 as the Nantucket Harbor Shimmo and Plus Parcels Sewer Extension Project is completed and brought online. This new forcemain will be maintained in accordance with existing practices at the NSD.

4.6 Corrosion Control

The dissolved oxygen (DO) content of the wastewater is often depleted in the wet well of pumping stations. This can lead to generation of hydrogen sulfide gas (H₂S) and subsequent corrosion and odor issues in the station. Wet well cleaning is one measure that can mitigate these issues and a cleaning program will be considered as part of the CMOM Program. Hydrogen sulfide corrosion is not a widespread issue in the Nantucket sewer system and, as a result, the Town does not have a written plan for corrosion control. The Sewer Department will be creating a plan for reviewing and replacing severely corroded components of the system as part of the CMOM Program.

The Town does take H₂S corrosion into consideration during design of new or replacement sewers and makes an effort to control H₂S levels in the system via chemical dosing. Chemical dosing is applied in the form of chlorine and sodium hydroxide. All doses are logged and records are kept at the Sewer Department.

4.7 Non-Sewer Department Owned Pump Stations

Although the NSD owns and operates nearly all the pump stations on the island, there is one private sewage pump station in the Siasconset Sewer District on Towady Road. It receives very little flow and is maintained privately, though it pumps its flow into the Siasconset Sewer system.

There is also one storm water pumping station, which is owned by the Town of Nantucket and is operated with help from the NSD by the Department of Public Works (DPW).

There are several private pumping stations across the Island, which are not currently operated or maintained by the Town's Sewer Department.

A new pump station was constructed as part of the Nantucket Harbor Shimmo and Plus Parcels Sewer Extension project on Wamasquid Lane in the Hussey Farm Neighborhood. It is owned and operated by the NSD.

The Town is not responsible for any on-lot grinder pumps that are very common across the island on private property.

5. Collection System Maintenance

5.1 Right-of-Ways and Easements

There is currently no scheduled maintenance in right-of-way and easements. There are no known manholes or sewer lines on private property, but this will be well documented during the CCTV Inspection program and CMOM program. The NSD will identify all manholes and sewer lines located in cross country easements as part of the CCTV Manhole Inspections. GIS maps and legal descriptions will be updated as the program progresses.

5.2 Root Control

Currently the NSD has no formal root control program. Roots are removed or treated as part of the CCTV Inspection project and will be removed to allow for access to CCTV. In addition, roots (heavy, medium, fine) are being noted in the CCTV reports and the Town's consultant will provide recommendations for root control. The NSD will take up a formal root control program as part of this CMOM program and as informed by the CCTV program. In 2017, the NSD acquired a new jet truck that has the capability to spray root inhibitors. This truck is already in use by the department and the root inhibitor chemicals will be integral in the root control program. The NSD will be working to develop and implement a formal root control program during 2019.

5.3 Sewer Cleaning

The Town's preventative sewer maintenance activity is essentially sewer line cleaning. Sewer line cleaning has been initially prioritized based on institutional knowledge of the collection system and overlap with other utility projects. Currently, there is a standard operating procedure (SOP) in place for cleaning of sewer lines. The Town owns a mechanical rodder truck and two jet trucks for cleaning. In addition, the NSD may use chemicals to assist in cleaning lines. Sewer line cleaning is also performed prior to CCTV inspection of pipes. The Town's CMOM Program created and implemented such a program with the assistance of Steve Tilson Associates (as noted in Section 2.3 Training). The Town signed a contract with Tilson & Associates, LLC, of Torrington, CT. Tilson and Associates is a consulting firm specializing in wastewater collection systems operation. In October 2017 Tilson and Associates performed an assessment of NSD collection system maintenance focusing on pipe cleaning and safety and subsequently provide training to ensure more effective and efficient use of equipment and a more thorough understanding of maintenance procedures for the staff. A report created from the assessment was delivered to the NSD in November 2017 and highlighted areas and practices that could benefit from improvements. Tilson & Associates, LLC will be performing training for NSD personnel in 2019, which will help standardize O&M practices.

As cleaning is performed, all records will be kept in a customized database, which will allow for tracking the following:

- Date, time and location of cleaning activity

- Specific lines cleaned
- Equipment used
- Identity of cleaning crew
- Presence of roots, grease, or debris
- Volume of debris removed (where applicable)
- Problems identified or other follow up actions necessary

Each line segment cleaned is identified by an asset ID number and can also be identified by the asset IDs of the upstream and downstream manholes.

Currently this program is performed by a Contractor and the required procedures for cleaning prior to inspection or provided in Section 6.1 CCTV Inspections. During 2018, the NSD acquired a CCTV Van and performs some inspections independently of the contractor as well.

5.4 Parts and Equipment Inventory

The NSD equipment inventory is maintained by the Administrator and Chief Mechanic. The following table itemizes existing equipment and inventory.

Table 5-1 Equipment Inventory

Item	Unit	Existing Inventory	Suggested Inventory	Comments
Inflatable Sewer Plug – 6"	EA	1	1	Available with Sewer Department
Inflatable Sewer Plug – 8"	EA	1	1	Available with Sewer Department
Inflatable Sewer Plug – 10" Flow Thru	EA	1	1	Available with Sewer Department
Inflatable Sewer Plug – 24" Flow Thru	EA	0	1	N/A
Crank Style Sewer Plug – 4"	EA	2	2	Available with Sewer Department
Crank Style Sewer Plug – 8"	EA	1	2	Available with Sewer Department
Crank Style Sewer Plug – 10"	EA	0	2	N/A
Crank Style Sewer Plug – 12"	EA	0	2	N/A
2" Sump Pump	EA	4	4	Available with Sewer Department
2" Mud-Sucker Pump	EA	1	1	Available in Building 6
Chainsaw - 16"	EA	1	1	Available in Building 3, Garage
Leaf Blower	EA	1	1	Available in Building 3, Garage
Commercial Weed Whacker	EA	1	1	Available in Building 3, Garage
Hedge Trimmer	EA	1	1	Available in Building 3, Garage
15 HP Snowblower	EA	1	1	Old Shop Building 2
6 HP Shop Vac	EA	1	1	Old Shop Building 2
Manhole Lifting Devices	EA	2	2	Available on Trucks

Item	Unit	Existing Inventory	Suggested Inventory	Comments
Vactor Accessories - Grease Nozzle	EA	0	1	N/A
Vactor Accessories - Root Cutter	EA	0	1	N/A
Vactor Accessories - Large Diameter Nozzle	EA	1	1	Available with Sewer Department
Vactor Accessories – Warthog	EA	0	1	N/A
28 Foot Fiberglass Extension Ladder	EA	3	3	Available in Building 5
2 Ton Gantry Crane	EA	1	1	Available in Building 5
2 Ton Foldable Engine Crane	EA	1	1	Available in Building 5
1 Ton Dump Truck	EA	1	1	Available with Sewer Department
Vac Con Jet Truck	EA	1	2	Available with Sewer Department
SERECO 800HPR Jet Truck (Acquired 2017)	EA	1	1	Available with Sewer Department
Dodge ProMaster 3500 Aries CCTV Van	EA	1	1	Available with Sewer Department
Pickup Truck	EA	2	2	Available with Sewer Department
Crew Cab Truck	EA	2	2	Available with Sewer Department
LEICA Global Positioning System	EA	1	1	Available with Sewer Department
Portable Trash Pump - 4"	EA	1	1	Available with Sewer Department
Portable Trash Pump - 6"	EA	1	1	Available with Sewer Department
Portable Trash Pump - 8"	EA	0	1	N/A
20' Trash Pump Suction Hose - 4" X 10'	LF	250	250	Available with Sewer Department
20' Trash Pump Suction Hose - 6" X 10'	LF	0	250	N/A
30' Trash Pump Suction Hose - 8" X 10'	LF	0	150	N/A
Trash Pump Discharge Pipe - 4" X 20'	SEC	0	50	N/A
Trash Pump Discharge Pipe - 6" X 20'	SEC	0	50	N/A
Trash Pump Discharge Pipe - 8" X 20'	SEC	0	25	N/A
4" Fitting	SET	0	1	N/A
6"Fittings	SET	0	1	N/A
8"Fittings	SET	0	1	N/A
Air Compressor	EA	0	1	N/A

6. Collection System Testing and Inspection

The NSD has embarked on a new system for testing and inspection all sewer lines. The goal of this program is to complete the entire system assessment in three years; with developing a schedule for ongoing assessment annually thereafter. The Town has set a goal of inspecting 100,000 linear feet of sewer pipe annually for the three-year period, of which one year is complete, and the second year is approximately 90% complete.

The Town of Nantucket began a cleaning, inspection and assessment program in the Fall of 2017, having approved a Contract with National Water Main Cleaning Services to perform closed circuit television video (CCTV) and manhole inspections at the October 11, 2017 Board of Selectmen Meeting. Presently, the Town owns and operates one Vac-Con truck, one SERECO 800 HPR jet truck, one mechanical rodder, and one Dodge ProMaster 3500 Van with Aries CCTV equipment. This will allow the Sewer Department to perform cleaning and inspection activities in-house. A methodology for inspection priority has been developed by focusing on the known problem areas, critical infrastructure components and select areas based on ongoing related projects. The results from the CCTV program will be used to establish cleaning frequency and prioritize the repair or replacement needs for each component. Institutional knowledge of the condition of the collection system is also being used to establish a more frequent cleaning schedule for identified problem areas.

In December of 2018, the Town entered the Year 2 contract with Ted Berry Company, Inc. of Livermore, Maine. This contract mirrors Year 1, but also includes provisions to gather global positioning system (GPS) coordinates for all manhole structures inspected during Years 1 and 2. Work on this contract began on January 7, 2019.

The cleaning, inspection and assessment efforts will be performed by designated Town of Nantucket staff from the Sewer Department and supported by the selected consultant team and selected contractors. All data will be electronically entered into AGO database discussed in previous sections of this manual.

The CCTV programs include: sewer cleaning, CCTV inspection and National Association of Sewer Service Companies (NASSCO) Pipe Inspection and Certification Program (PACP) Version 7.0 condition assessment of piping, Level 1 inspection and Manhole Inspection and Certification Program (MACP) Version 7.0 classification of the manhole structures and their flow channels. Results from these programs will be used to identify, categorize and prioritize cleaning and inspection frequencies for the designated areas of the Town's collection system.

The cleaning and CCTV schedules are closely coordinated. The Sewer Department is making cleaning a priority and aim to proactively clean sewers. The Town also intends to continue to inspect a portion of the manholes annually in conjunction with the sewer pipe inspections. The Town is inspecting drain lines as well, looking for illicit connections or any possible combined sewer systems currently unreported.

Information from cleaning and inspections is entered into a customized database to allow for easier use and tracking by Sewer Department Staff. This database is accessible via traditional desktop GIS software, web-based applications, and through the use of software applications on smartphones and tablets.

For more details related to cleaning sewer lines refer to Section 5.3 Sewer Cleaning.

6.1 CCTV Inspections

The CCTV Inspection work is currently being performed by a Contractor. The Contractor's responsibilities include:

- Cleaning Prior to Inspection
- CCTV Inspection of pipelines and manholes
- Provide the following deliverables: viewing of video, pictures, and .pdf reports, PACP database containing all asset and inspection data, all video (.WMV or .mp4) and pictures (.JPG) associated with CCTV inspections, all .pdf line reports for inspected pipelines to include: Project Summary, Plot Listing Image (4/page), PACP Condition Grading Report

Cleaning in preparation for a CCTV inspection must be performed more thoroughly than for routine maintenance. Pipe walls must be clean enough for the camera to discern structural defects, misalignment, and points of infiltration. Small amounts of debris left in the sewer invert, such as sand, stone or sewage solids, may not interfere with effective inspection. At a minimum, cleaning shall achieve a 95% open area. Some pipes may need to be cleaned during the night time hours, as determined by the town.

Types of cleaning include:

- Light Cleaning- Light cleaning shall be defined as up to three (3) passes of high pressure water jetting to achieve a minimum 95% open area
- Heavy Cleaning – Heavy cleaning shall be defined as cleaning requiring more than three (3) passes of high water jetting to achieve a minimum 95% open area. Situations requiring the use of heavy cleaning may include, but are not limited to, large amounts of debris or heavy root growth within the existing sewer line. Heavy cleaning shall not be conducted without prior approval of the Town.

Sewers are generally cleaned upstream starting at the downstream manhole of the area to be worked in. Equipment used should be capable of removing dirt, grease, rocks, sand, light roots, and other materials and obstructions found in sewer lines. If an entire section cannot be cleaned from one manhole it may be assumed that there is a major obstruction and the flushing should be terminated. A CCTV inspection should follow. A note should be made whether the obstruction will pose an immediate problem such as backup or overflow and that information should be given to the Town immediately.

The contractor should be aware of several precautions to be taken during cleaning operations. Eroded, corroded, or otherwise deteriorated pipe may collapse during cleaning operations. Visible inspection must be used to ascertain the advisability of cleaning. Sometimes a CCTV inspection must be made prior to cleaning. Clean soil and pieces of broken pipe or tile observed in a manhole are strong indications of broken, crushed, or collapsed pipe in the upstream section; caution in the continuation of work should be used. Pipe damage is possible any time powerful cleaning equipment is used. Cleaning equipment and tools should be matched to both the pipe conditions and the job to avoid pipe damage.

All solids or semi-solid materials shall be removed at the downstream manhole via vacuum tubes. If large material is found that needs to be removed by hand, confined space entry procedures will be followed. If a confined space entry is required, the Contractor shall provide space entry requirements as defined by OSHA regulations.

During flushing operations that involve vacuuming, the need to decant water will become necessary. This will be performed into a downstream manhole capable of handling extra flow with a 4" drain hose. A drain port on the vacuum tank will be located so as not to allow solid materials to be drained into the sewer system. A hydraulic pump-out option may be used when conditions allow.

All materials removed by vacuum from the sanitary sewer system shall be disposed of in accordance with local, state, and federal disposal regulations at an area determined by the Town.

It is standard procedure to perform a sanitary sewer CCTV inspection from one manhole up or downstream to another manhole. This will typically be accomplished by inserting a transporter with camera head into a manhole. The transporter will be controlled by the operator, and it will travel the length of pipe to be inspected following NASSCO PACP standards and any Town-supplied specifications. During the inspection, the camera operator will be responsible for noting any faults or connections into a log-style database for future reference. All mainline inspections will require the use of different transporters and will be determined on site by the operator. The operator will have the knowledge required to choose the best transporter for the specific line segment.

The contractor should recognize that there are some conditions, such as broken pipe and major blockages, which prevent a complete inspection from being accomplished or where pipe or equipment damage would result if inspection were attempted. Should such conditions be encountered, the Contractor should not be responsible to inspect those specific pipe sections. The camera operator should be knowledgeable of and alert for any conditions which warrant termination of inspection activities.

Precautions should be taken in areas where pipe/joint deflections may cause transporter or cameras to become lodged in the sewer line. The operator will have the knowledge to recognize and evaluate these situations on an individual basis. Segments of line that have not been properly cleaned may also cause a risk which will be made known to the Town prior to inspection. Segments of line that have major root growth may also impede the inspection process.

The Cleaning, Inspection and Assessment programs goal is to inspect the entire collection system as expeditiously as possible starting with the areas of greatest importance. Nantucket's CCTV contractor will be able to document:

- The structural condition of the pipe
- The operational condition of the pipe
- Root intrusion
- Blockages
- Grease and sediment buildup
- Protruding connections

- Evidence of inflow and infiltration (I/I) or surcharging
- Manhole pave-over's
- Other deficiencies that factor into condition assessment

Video inspections are generally scheduled to follow planned cleaning. In the event of an abandoned CCTV Inspection, the contractor or Town staff may need to perform a reversal on the pipe or utilize additional technology, such as a handheld pole camera. Should the survey find a blockage, the blockage would be removed and the CCTV inspection completed as planned.

All newly constructed sewer lines are required to be CCTV inspected by the contractor or developer to verify as-built drawings and ensure the line has no construction defects. Additionally, all new pipes are required to be pressure tested to ensure tightness and prevent release of sewer odors and future infiltration. Pipe pressure testing and deflection testing are required by the contractor once the designated street or pipeline has been completed to ensure proper installation and future performance. Manhole testing requirements have not yet been established, but are being evaluated by the Town at this time. As part of the CMOM Program, all new infrastructures will be updated within the GIS.

6.1.1 Manhole Inspections

Manhole inspections help keep the asset inventory up-to-date and are used to update collection system maps, determine structural and hydraulic conditions and prioritize/schedule maintenance activities. During manhole inspections, field crews take a complete inventory of each manhole including construction materials, ring size, depth to invert, flow conditions and document evidence of problems.

Manhole inspections are to be performed as Level 1 inspections, following NASSCO MACP V7.0 criteria. Results will be reviewed by the consulting team retained by the Town. The manhole inspection program began in the Spring of 2018 and will be continuing every year thereafter. For manholes, a minimum of three photos linked to the inspection record and shall be taken as follows:

- General site photo
- Inside photo showing flow channel and manhole barrel
- Inside photo showing chimney and casting conditions

The CMOM Program implemented a rating system to prioritize which manholes will be rehabilitated or replaced first. Manhole inspection information will be electronically stored in the database. Based on the inspection data and priority assigned to manhole repairs, Town Staff or contractors will be able to perform the repairs.

As part of the Year 2 contract, GPS coordinates will also be collected for each manhole. This information will be stored in the database and will create a spatially accurate depiction of the collection system, as well as allow operators to quickly and accurately locate manholes in the field.

6.1.2 Sewer Pipe Inspections

While routine cleaning and visual inspection are used to assess the condition of manholes and surface facilities, CCTV video inspections are the primary method used to assess the condition of the sewer pipes. The CMOM Program for the Town of Nantucket will develop a procedure to determine where and when CCTV inspections should be carried out. While a prioritization system is implemented, the Town has identified several key areas where overlap with other utility projects necessitates immediate CCTV inspections. Five NSD employees received NASSCO PACP/MACP certification in March 2018 and are able to assist the contractor, perform their own inspections, and participate in determining areas of priority for CCTV inspections.

Information gathered from the CCTV inspections will be reviewed by the Town's consultant and updates to the GIS database will be made. The findings will help determine short and long-term maintenance strategies including increased cleaning, root treatment, sewer line repair, or replacement. The condition assessment will help establish the cleaning frequency and support Nantucket's capital planning. Sewer line repair or replacement projects are also coordinated with other work taking place in the Town in an effort to minimize disruption to daily activities. Condition assessments document the following details and deficiencies:

- Characteristics including pipe diameter, and age and type of material
- Dips in line
- Grease build-up
- Root intrusion
- Sediment accumulation and encrustation
- Structural condition, including cracks, corrosion and erosion
- Joint alignment and movement
- Obstructions
- Deformations

6.2 Infiltration and Inflow

CCTV inspections identify locations of suspect infiltration and inflow (I/I) sources, however a much-detailed investigation should be conducted to evaluate and quantify these sources of I/I in the collection system. The Town of Nantucket conducted an I/I Study in 2005. As a result of the previous study, many improvements have been made to the Town Sewer Area. The NSD conducted an I/I study during 2018. The following scope of work is included in this recent I/I program:

- Develop Sewershed Areas
- Collect Flow/Rainfall Monitoring Data

- Perform I/I analysis
- Compile a list of I/I removal projects and next steps to mitigate I/I.

The NSD has hired a Consultant to assist with this program. The consultant conducted a temporary flow and rainfall monitoring program to establish a recent, continuous and simultaneous data set of velocities, depths and flows in the sewer system. This monitoring program utilized area-velocity metering equipment that allows measurement of flows and levels both below and above the pipe crown, to capture the range of potential sewer system responses to rainfall, including surcharged conditions. Data was reported in five-minute intervals. The data collected will inform the evaluation of infiltration and inflow, as well as be used in the calibration/validation of the hydrologic/hydraulic model (refer to Section 7 – Collection System Capacity Analysis). Flow meters installation was completed on March 23, 2018.

The flow and rainfall monitoring program was conducted from March 23, 2018 through July 18, 2018. This monitoring period allowed for the analysis to reflect a range of seasonal fluctuations in flows. A total of ten (10) temporary flow meters and two (2) rain gauges are included in this task. The consultant selected the monitoring locations, administered the sub-contract to the flow monitoring sub-consultant, and conducted QA/QC for the data collected.

The consultant evaluated inflow and infiltration into the sewer system, based on the flow and rainfall data collected during the monitoring period. Any rainfall data collected concurrently by the Town at other locations was obtained to supplement the temporary rain gauge data collected. All data collected was screened and QA/QC'd, using visual hydrograph analysis, flow balancing, and scattergraph analysis.

For each monitored sub-area, measured wastewater flows were separated into groundwater infiltration, sanitary flow, and rainfall dependent infiltration and inflow (RDI/I) resulting from the measured rain events. Dry weather groundwater infiltration rates were calculated and monitored sub-areas were ranked by magnitude. RDI/I rates were calculated and ranked separately. GWI rates were established in units of gallons per day per inch diameter mile of pipe to reflect the impact of GWI in each sub-area.

Inflow volumes and peak rates were quantified and analyzed to determine the impact of each rainfall event observed and to assist in predicting the impact for design storms (e.g., 1-year 6-hour). R-values were developed as a tool for ranking sub-areas with high RDI/I.

The normalized I/I quantities were evaluated and a priority list developed by ranking GWI and RDI/I via MADEP guidance (2017) thresholds.

The data collected from the monitoring period will be used to update the model calibration and was reported on in the Year 1 CMOM Program Summary Report, dated December 2018.

Based on the abovementioned analyses and evaluations the Consultant prepared and submitted a Draft I/I Report. The Draft Report was submitted to the Town for review and comment and included the recommendations for I/I removal projects and additional steps to be taken to remove/reduce I/I in both the Siasconset and Town Collection Systems.

Figure 6-1 Town Area Sewershed

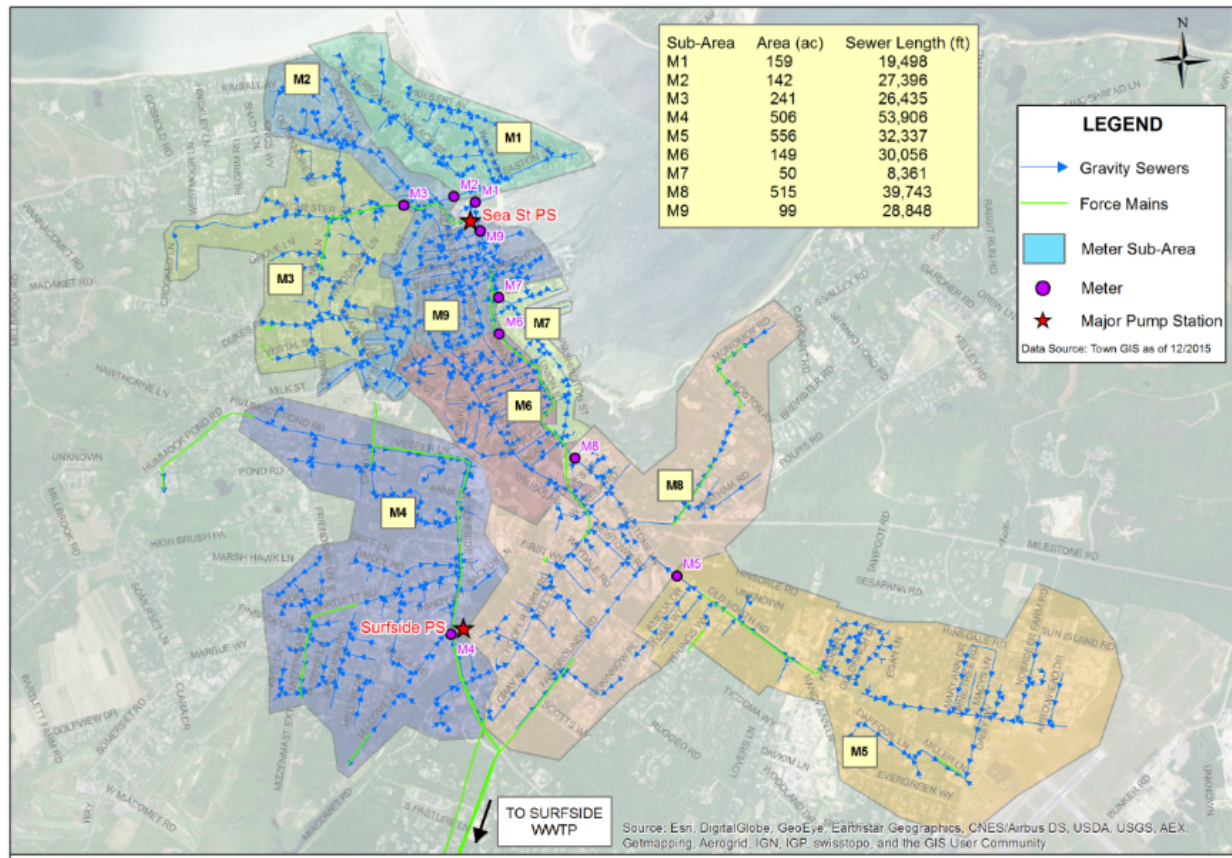
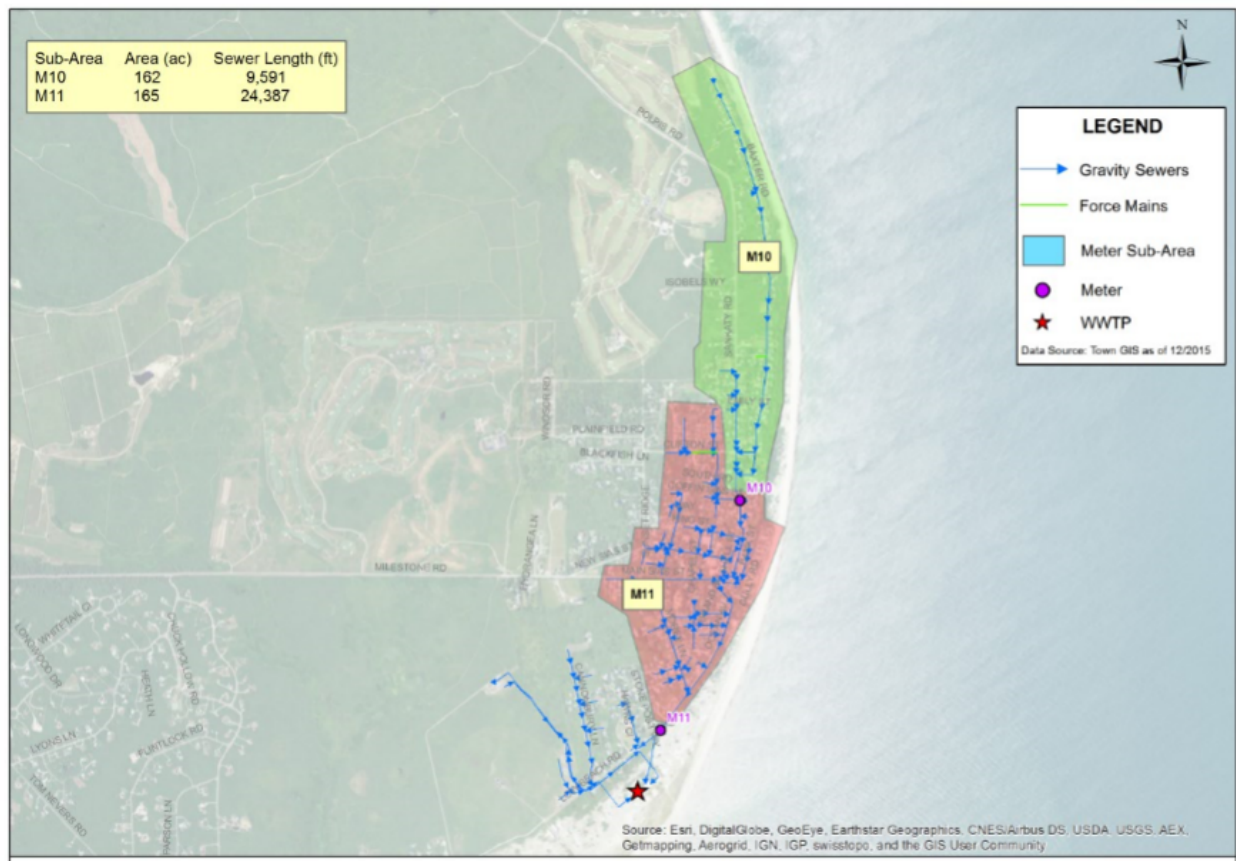


Figure 6-2 Siasconset Area Sewershed



7. Collection System Capacity Analysis

The Town's state approved CWMP Update in 2014 evaluated the current and future capacity needs for the Surfside WWTF. Some of the collection system capacity was completed under the Shimmo and Plus Parcels Project. As part of this CMOM Program, the NSD completed the remaining capacity analysis and updated the 2014 analysis.

A complete and updated capacity analysis was performed for both Town and Siasconset sewer areas to identify bottlenecks in the collection systems under various storm events and dry weather. This capacity analysis will be used as a tool by NSD for identification of improvements to the systems and long-term planning. The model created in this program will assist the Town in making decisions for future request for service connection tie-ins to the collection systems.

7.1 Sewer System Model

The NSD worked with a Hazen and Sawyer to create models of the Town and Siasconset sewer districts. The model includes information obtained by:

- Record drawings and sewer mapping
- Geographic Information Systems (GIS) data
- Closed-Circuit Television (CCTV) data
- Records from staff regarding field observations (e.g., SSO history, etc.)
- Pump station flow and operational data
- Shimmo and Plus Parcels Sewer Extension Downstream Capacity Analysis (2017)

The model created is a dynamic hydraulic model including gravity lines, major pump stations and the WWTPs. Pump stations will be explicitly modeled on a case-by-case basis depending on criticality to the overall analysis. At a minimum, the Sea Street Pump Station, Surfside Pump Station, and Surfside and Siasconset WWTPs Headworks (at both WWTPs) will be included.

The constructed model networks will be performed by importing Town-provided GIS data for modeled sewer pipes and manholes into the model software program, and performing a QA/QC analysis on pipe/manhole connectivity and alignment. Data gaps were populated using a combination of record drawings, field inspection data, and other data provided by the Town. Interpolation and extrapolation of inverts and/or rim elevations was performed when no other reliable data sources existed. Sewer sub-areas established in the I/I analysis were used as a starting point for delineation of flow inputs in the model network. The larger sub catchments were subdivided as required to achieve appropriate modeling resolution. Pump station operational information was defined in the model for explicitly-modeled pumps, and WWTP headworks were also defined. When electronic GIS data was not available, record drawings or field inspections were utilized to populate the required model data.

The NSD has a partial model established for part of the Island. This model was completed in order to allow the extension of sewers in the area of Shimmo. The model was developed using PC-SWMM (Stormwater Management Model) version XPSWMM 2016, by XP Solutions. Figure 7-1 illustrates the capacity analysis performed for the extension of Shimmo and additional parcels in the area.

The model was configured to represent both dry weather flow conditions as well as wet weather performance of the collection system. Dry weather flows were developed based on a combination of flow metering data, water consumption data, and/or population data as appropriate. Wet weather flows were developed using standard hydrologic parameters that represent the rainfall-dependent infiltration and inflow response of sewer systems. Flow and rainfall monitoring data collected were used to perform dry and wet weather calibration and verification of the hydraulic model. Representative storm events of varying intensities and depths were selected from the rainfall data set and used for calibration and verification. A minimum of three (3) storms were used for calibration and one (1) for verification of the model.

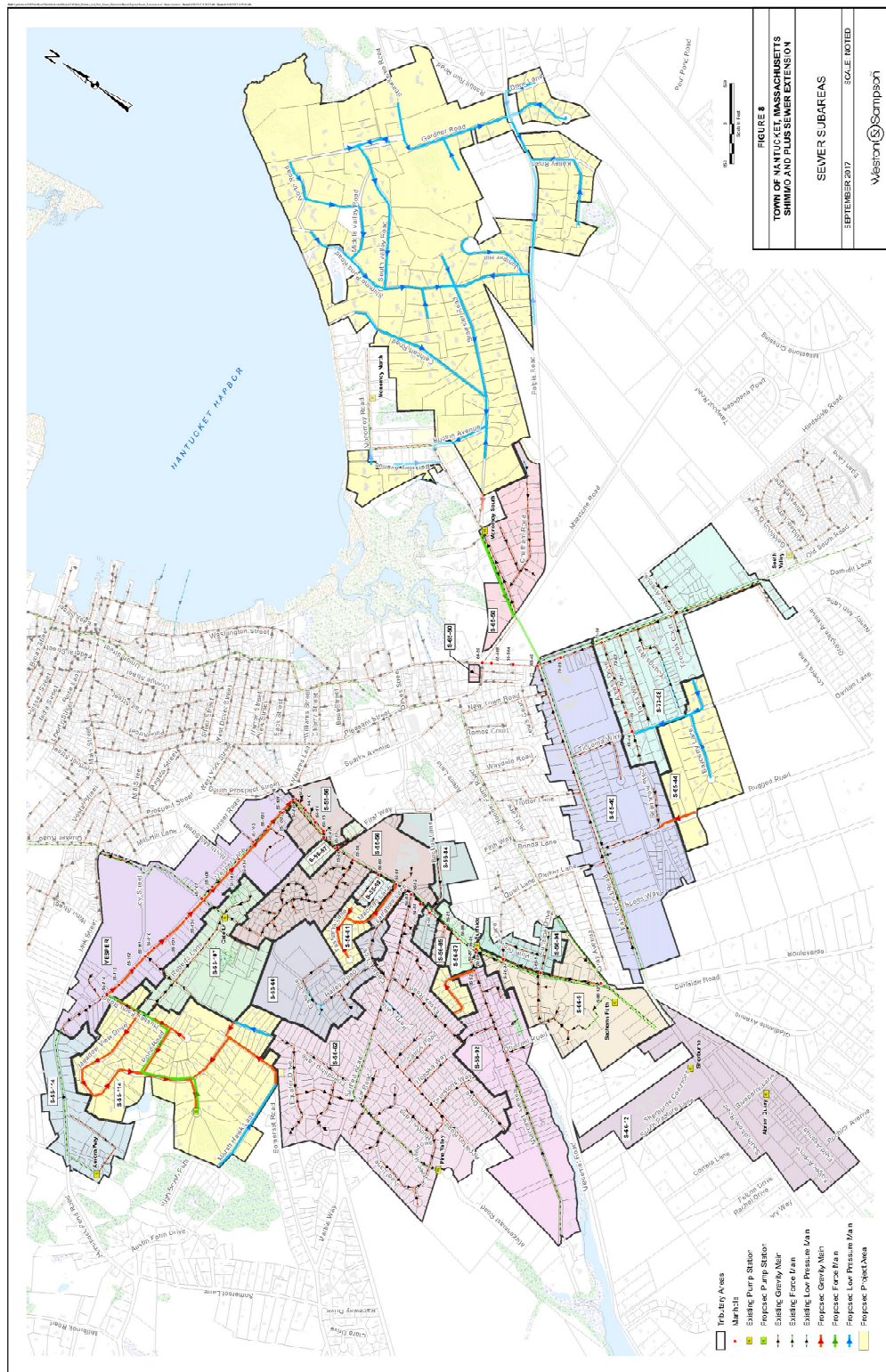
The model was calibrated by adjusting hydrologic and hydraulic parameters until reasonable agreement is reached between observed and predicted flows, volumes and depths. Model calibration accuracy and quality will be judged by industry-standard guidelines, such as delineated in the Wastewater Planning User's Group Code of Practice for the Hydraulic Modelling of Sewer Systems (Nov. 2002). The guidelines establish general acceptable ranges for model accuracy, as follows:

- Dry weather peak flows within +10% and -10%
- Dry weather flow volumes within +10% and -10%
- Wet weather peak flows within +25% and -15%
- Wet weather flow volumes within +20% and -10%
- Wet weather peak depths within +1.6 feet and -0.3 feet

This calibrated and verified model will be used to simulate design storm events, and evaluate the sewer system response to wet weather, including the 1-year 6-hour storm, 5-year 24-hour storm, and 10-year 24-hour storm. Baseline (current conditions) and ultimate build out (future growth) scenarios will be evaluated. The ability of the sewer system to convey baseline and future flows during both dry and wet weather will be evaluated. Locations of predicted SSOs, surcharging and hydraulic deficiencies will be identified. Volumes of predicted SSO's at each location will be provided for each storm event. Pump station performance will also be evaluated. Tables and figures depicting the performance of the collection system for each storm event will be developed. Tables will show the length of sewers surcharged by size ranges, and figures will illustrate locations of SSOs, and sewers that are partially and fully surcharged, including type of surcharge (i.e., backwater-induced or capacity-related).

This model will identify areas of capacity concern and will be updated annually with data received in a given year.

Figure 7-1 Shimmo Capacity Analysis Sewershed Model



8. Sewer System Rehabilitation

A major goal of the CMOM program is to establish areas of the collection systems that require rehabilitation and enact appropriate solutions to improve the systems. By analyzing CCTV inspection reports, the Capacity Analysis Report, and the Infiltration and Inflow (I/I) Report, the NSD will be able to identify where structural defects and/or operational deficiencies exist in the system. The rehabilitation efforts will focus primarily on pipes and manholes. NSD has retained the services of a consulting engineer to assist with this process.

The NSD's consultant has been reviewing CCTV inspection footage and reports from Year 1 of the program and developing recommendations for rehabilitation. These recommendations, as well as relevant PACP quick scores, notes from the inspection, and other data about the pipes, are being input into the AGO maps. This allows easy access for NSD personnel to review progress or any areas of concern.

The consultant is also providing the NSD with monthly reports of "high priority" pipes, classified as those pipes which receive a PACP score of 4 or 5, and a notice in any instances where a severely defective pipe is discovered. For a pipe to be considered severely defective, it must warrant an immediate threat to the system's ability to function. Non-urgent recommendations are reviewed monthly with the Sewer Director, where as severely defective pipes are discussed immediately.

NSD also coordinates regularly with other utilities and town departments, including the Wannacomet Water Company and Department of Public Works (DPW) to schedule work in accordance with other projects that may be on going in the Town. In particular, NSD strives to minimize the impact to traffic and Town roads by scheduling any excavation to coincide with excavation being performed by another utility. This often allows for one excavation and only one round of paving in the Town. The NSD is currently striving to follow the Wannacomet Water Company's 10-year rehabilitation plan to eliminate as much disruption as possible.

8.1 CCTV Inspections

The NSD plans to inspect 100,000 LF of sewer pipe annually with the assistance of a CCTV contractor. CCTV inspections will follow the coding and guidelines set forth in the Pipeline Assessment and Certification Program (PACP) as established by the National Association of Sewer Service Companies (NASSCO). The reports generated from these inspections will allow the NSD and its consulting engineer to determine if pipes are structurally sound and if any operational deficiencies exist. The PACP codes are standardized and grade defects that may be found within pipes. These defects can range from minor cracks to holes in the pipe, through which voids are visible.

The CCTV Contractor will also carry out level 1 manhole inspections following NASSCO's Manhole Assessment Certification Program. Like PACP coding, MACP provides standardized codes that will allow the NSD and their consultant to determine the severity of any defects exist within the manhole structure and appropriate rehabilitation methods. These inspections began in late February 2018 and are continuing annually in conjunction with the CCTV pipeline inspections.

8.2 Capacity Analysis Report

As described in Section 7, a capacity analysis report was created for the collection systems in Nantucket. This report will help the NSD and identify hydraulic bottlenecks, which may cause Sanitary Sewer Overflows (SSOs). The NSD would then be able to evaluate alternatives to mitigate the possibility of SSOs in those areas. In this case, rehabilitation options may be more limited. These options will be further discussed in Section 8.4.

8.3 Infiltration and Inflow Report

The I/I Report will identify areas in the systems where excessive infiltration and inflow are creating unnecessary burden on the infrastructure. It is important to remove or mitigate these sources to alleviate additional flow both in the pipes, which may not be sized to pass the additional flow, and at the WWTP, where the NSD must treat the additional flow. Meters were installed in March 2018 and removed in July 2018.

8.4 Pipe Rehabilitation Options

The data generated from the processes described in Sections 8.1 through 8.3 will allow the NSD and its consultant to recommend effective rehabilitation for the defects discovered in the system. Rehabilitation options can be classified into two distinct groups: trenchless technology and open cut repair. Year 1 pipe inspections were evaluated by Hazen and Sawyer and design of these rehabilitation recommendations began in March 2019.

8.4.1 Trenchless Technology

Trenchless technology implies that no excavation will be necessary to complete the prescribed rehabilitation. Most commonly, this refers to full length Cured-In-Place-Pipe-Lining (CIPPL) and short liners used for Internal Spot Repairs (ISRs). In both cases, a flexible liner, coated in resin, is inserted into the pipe before being inflated and cured with steam or ultra-violet (UV) light. Both CIPPL and ISRs are typically structural and act as if you have installed a new pipe within an existing pipe. These are often valuable, cost effective tools to repair non-major structural defects. Some examples where CIPPL and ISRs can be used include, but are not limited to, cracks, fractures, and infiltration stains.

Some defects can also be repaired internally using grout. Specially engineered grout can be injected into imperfect joints to seal them and prevent infiltration/exfiltration.

A fourth trenchless option is pipe bursting, a process in which a new HDPE pipe is pulled through the existing pipe using specialized equipment. The new pipe expands (“burst”) the existing defective pipe, allowing the new pipe to lay in the same alignment as the original pipe. Pipe bursting has several inherent challenges and is typically only recommended as a final alternative to a full length open cut pipe replacement.

8.4.2 Open Cut Repair

Open cut repair requires the excavation of a trench and is often more costly than trenchless rehabilitation options. Open cut repair is typically only recommended in cases where trenchless technology cannot repair the defect. Some examples include, but are not limited to, holes where a void is visible, capacity restrictions, and deformed or collapsed pipes.

Open cut repairs can be grouped as Excavated Point Repairs (EPRs) and full-length pipe replacements. When performing an EPR, only a small portion of the pipe run is replaced. EPRs are typically recommended when the majority of the pipe is in good condition or can be rehabilitated by a trenchless technology. A full-length pipe replacement is the most resource intensive option for rehabilitating sewer pipe and is recommended only when no other alternative is viable.

8.5 Manhole Rehabilitation

Manholes can have a number of defects, both structural and operational, which can be repaired without replacing the entire manhole. Depending on the severity of the defects, manholes may need to be replaced via excavation. Commonly, manholes will require masonry work to repair crumbling bricks, missing mortar, or missing pieces of the manhole, such as the bench and invert at the bottom. Maintaining manhole structures can prevent blockages in the system, limit I/I, and prevent surface problems, such as pavement degradation. Manholes recommended for rehabilitation are included in the design task for the Year 2 CMOM contract with Hazen and Sawyer.

8.6 Additional Rehabilitation and Maintenance Programs

In addition to structural defects, special consideration will be given to rehabilitation of operational deficiencies. This may include sewer line cleaning and implementation of a root control/treatment program. The CCTV inspections will allow the NSD to identify areas that require cleaning to remove debris, grease, or any other items that may be clogging the sewer pipes. The NSD is also currently establishing a Fats, Oils, and Grease (FOG) program, which will educate the public on what should not be put down the drain, as well as establish cleaning protocols for areas of the collection systems that experience heavy FOG loading.

CCTV inspections will also identify root ingress. Root growth in the sewer pipes can cause flow obstruction, structural damage, and allow for infiltration/exfiltration. In many cases, the roots can be cut out using cutting attachments on the jet trucks. These hydraulically driven saws spin at high RPMs and cut through the roots, which can then be removed via traditional cleaning. Roots can also be chemically treated to cause root death. The NSD will work with its consulting engineer to develop a root control program as part of the CMOM effort.

Appendix A: Templates for Sewer Complaints

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Work Order Template

Blue Sheet: Work Orders for Customer Walk-ins or Calls
Yellow Sheet: Internal Work Orders



Town of Nantucket
SEWER DEPARTMENT

☐ DAVID ☐ LORA ☐ _____

DATE: M T W R F / / TIME: _____ AM / PM

NAME: _____

BUSINESS: _____

PHONE: _____

EMAIL: _____

SUBJECT: _____

Action Needed:

☐ FYI ONLY ☐ CALL / EMAIL ☐ _____



Town of Nantucket
SEWER DEPARTMENT

☐ LOW / FUTURE ☐ TIME PERMITTING ☐ URGENT

DATE: M T W R F / / TIME: _____ AM / PM

REQUESTOR: _____

DEPT: _____ EXT: _____

EMAIL: _____

FOR: _____

Action Taken:

☐ _____

Work Order Example



Town of Nantucket DPW

188 Madaket Road
Nantucket, MA 02554
Office: (508) 228-7244

Work Order

Date Created: **Jun 23, 2017**

Scheduled: **Jun 24, 2017**

Work Started:

Completed: **Jun 24, 2017**

Dig Safe #:

Work Order: **WO-5742**

Priority: **Medium**

Division: **Wastewater**

Entered By: **KEBBATI, LORA**

Request By:

Assigned to: GARY, ARDIS

Task: Other

Desc: Patron reports total loss of plumbing at her property since Thu 06/22/17. Plumber has been working to address the problem, which he believes is in the lateral. This office has provided sewer permit records to plumber, who is working with Toscana to resolve the issue. Plumber is requesting (on behalf of the patron) that the main near her location be checked; she believes issue may be compounded by the sewer work being done in the nearby area.
REQUESTOR: Bruce Hermansdorfer 508-228-3677
(**Please see attached notes)

Address: 14 QUAKER RD

Loc: Property owner: Dorothy Hesselman - 508-228-9972 or 508-257-4651

LABOR				EQUIPMENT		
Date	Employee	Pay Rate	Hours	Date	Equipment	Hours
MATERIALS						
Date	Material				Unit	Quantity

DPW Work Orders

Work Order ID: WO-5742
Age: 84 day(s)
Status: Assigned
Division: Wastewater

WORK ORDER DETAILS

Work Order Entered by: * KEBBATI, LORA

Requested By:

- ☐ Internal
☐ Patron

Nearest Address:

Street Name: QUAKER RD

Street Number: 14

Property Owner 1:

Property Owner 2:

Additional Location Details:

Property owner: Dorothy Hesselman - 508-228-9972 or 508-257-4651

Select Division:

Wastewater

Select Task:

- Gate Cleanout/Installation
Gate Cleanout/Maintenance
Other
Repair MH Cover
Replace MH Cover
Sewer Backup
Sewer Inspections
Sewer Service Maintenance & Repairs
Structure Adjustment Repair
Tie Card

Description of Work:

Patron reports total loss of plumbing at her property since Thu 06/22/17. Plumber has been working to address the problem, which he believes is in the lateral. This office has provided sewer permit records to plumber, who is working with Toscana to resolve the issue. Plumber

Assign Supervisor/Foreman

GARY, ARDIS

Assign Supervisor/Foreman (will receive email alert upon submit) *

GARY, ARDIS

Assign Employee(s)

- GARY, ARDIS
GORDON, TAQI
GRAY, DAVID
HARDY, JAMES
INGLIS, ROBERT
Karvin Smith
Larson, Chuck
LEVEILLE, WILLY
MANNING, KEVIN
MOONEY, SEAN

Does Work Order involve a Special Project?

-- select one --

Priority

- ☐ High ☒ Medium ☐ Low

Date Work Order Entered: *

June 23, 2017 clear

Date Work Order Started:

clear

Status:

- ☒ Assigned ☐ In Progress ☐ On Hold ☐ Completed

Staff Notes:



DIG SAFE

DOCUMENTS

Upload Photo:

- Work Order Photo ✕

Browse...

Upload Documents:

- Work Order Document ✕
• Work Order Document ✕
• Work Order Document ✕

Browse...

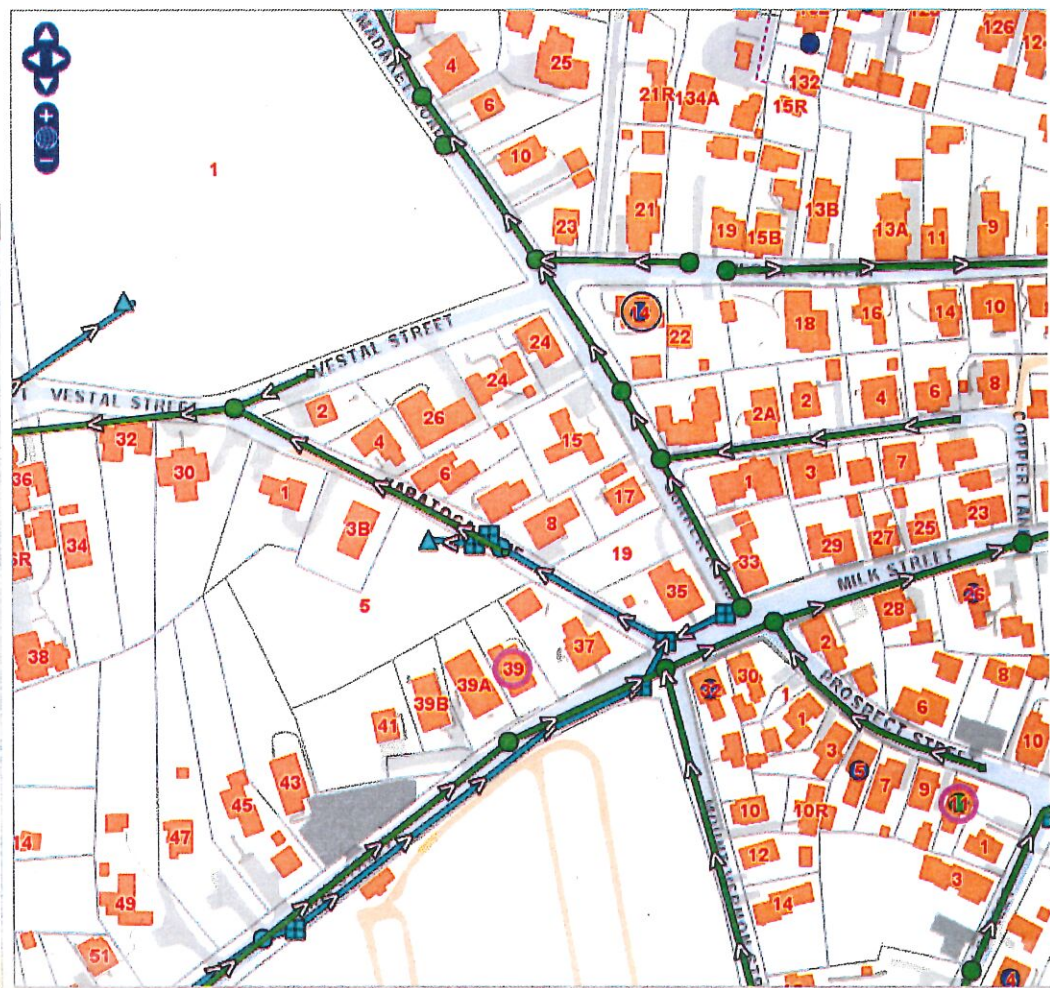
Documents Linked to this Address:

HISTORY

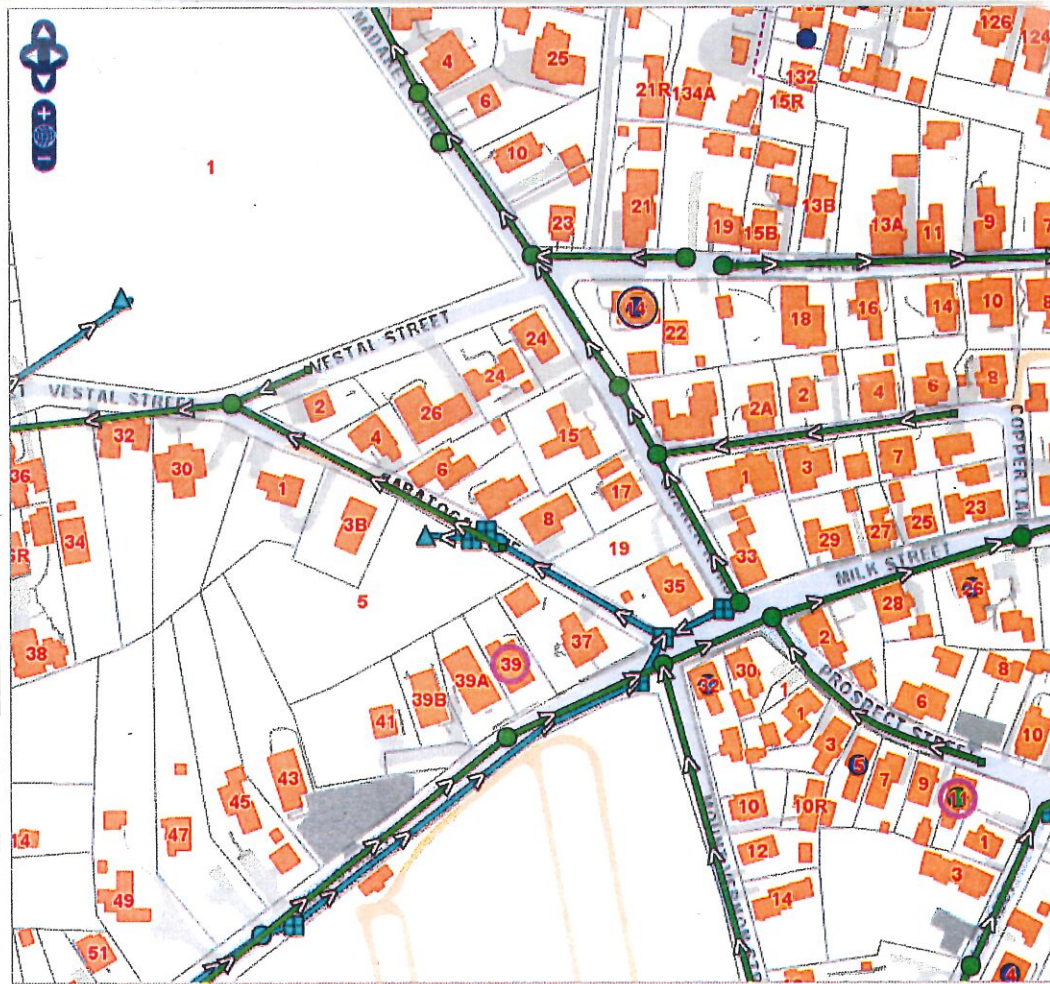
Submit

Cancel

Record: 1 of 7149 of 8203



1746204, 102579



1746093, 102120



Town of Nantucket
SEWER DEPARTMENT

☐ DAVID

☐ LORA

☐ *Vicenti*

DATE: M T W R F 6/22/17 TIME: 835 (AM / PM)

NAME: Dorothy Hesselman

BUSINESS:

PHONE: 8-9972

EMAIL:

SUBJECT: 14 Snaker

Conna Vestal

Plumbing at her house not
working all morning.
He called her
plumber, Bruce Hernandez.



Action Needed:

☐ FYI ONLY

☐ CALL / EMAIL

☐ _____

not Town issue but the lateral.
Ran snake but can't get through.



Send permit
file # 2468



Town of Nantucket
SEWER DEPARTMENT

REF: 60-5742

☐ DAVID

☐ LORA

☐ LOLL-in

DATE: M T W R F 6/23/17 TIME: 306 AM / PM (P)

NAME: Dorothy Hesselman

BUSINESS: _____

PHONE: 228-9972 H 257-4651

EMAIL: Dorothy

SUBJECT: 14 Quaker (follow up)

*Still no plumbing. Plumber hasn't
called her back.*



Called Bruce - last msg.

*406 pm Bruce called back.
Stoppage appears to be in her
lateral, 30 ft from house / 8 ft deep.
Working w/ TASCANA*

Action Needed:

☐ FYI ONLY

☐ CALL / EMAIL

☐

*Bruce called back shortly after
to say Paton would still like us to
check the main line
her house.*

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Appendix B: SSO Forms

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Massachusetts Department of Environmental Protection
Bureau of Resource Protection – Watershed Permitting Program
**Sanitary Sewer Overflow (SSO)/Bypass
Notification Form**

FOR DEP USE ONLY

Tax Identification Number _____

A. Reporting Facility

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



1. Facility Information

Reporting Sewer Authority _____

Permit # _____

2. Authorized Representative Transmitting Form:

First Name _____

Last Name _____

Telephone No. _____

Title _____

E-mail Address _____

B. Phone Notifications:

See DEP Regional Office telephone and fax numbers at the end of this form.

1. MassDEP staff contacted:

first name _____

last name _____

Date/Time contacted:

Date _____

Time _____

☐ am ☐ pm

2. EPA staff contacted:

first name _____

last name _____

Date/Time EPA contacted:

Date _____

Time _____

☐ am ☐ pm

3. Board of Health contacted:

First Name _____

Last Name _____

Date/Time contacted:

Date _____

Time _____

☐ am ☐ pm

4. Others notified (select all that apply);

☐ Conservation Commission

☐ Harbormaster

☐ Shellfish Warden

☐ Division of Marine Fisheries

☐ Downstream Drinking Water Supplier

☐ Watershed Association

☐ Beach Resource Manager ☐ Other:

(specify)

C. SSO Information

1. SSO Discovered:

Date _____

Time _____

☐ am ☐ pm

By: _____

2. SSO Stopped:

Date _____

Time _____

☐ am ☐ pm

3. SSO Discharge from:

☐ Sanitary Sewer Manhole

☐ Pump Station

☐ Backup into Property

☐ Other:

(specify)

4. SSO Discharge to:

☐ Ground Surface (no release to surface water)

☐ Direct to Receiving Water

(surface water)

☐ Catch basin to Receiving Water

(surface water)

☐ Backup into Property Basement



Massachusetts Department of Environmental Protection
Bureau of Resource Protection – Watershed Permitting Program
Sanitary Sewer Overflow (SSO)/Bypass
Notification Form

FOR DEP USE ONLY

Tax Identification Number _____

C. SSO Information (cont.)

Location: _____
(Description of discharge site or closest address)

5. Estimated SSO Volume at time of this Report: _____

Method of Estimating Volume: _____

6. Cause of SSO Event:

☐ Rain Event ☐ Pump Station Failure ☐ Insufficient Capacity in System

☐ Treatment Unit failure

☐ Sewer System Blockage: ☐ Pipe Collapse ☐ Root Intrusion ☐ Grease Blockage

☐ Other: _____
(Specify)

7. Corrective Actions Taken:

Impact Area cleaned and/or disinfected: ☐ Yes ☐ No

Corrective Actions Completed: ☐ Yes ☐ No

D. Comments/Attachments/Follow-up

I wish to provide (select all that apply):

☐ Attachment ☐ Additional comments below: ☐ No additional comments or attachments

Additional comments and planned actions:



Sanitary Sewer Overflow (SSO)/Bypass Notification Form

Tax Identification Number

E. Certification Statement

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signature of Authorized Representative

Date Signed

Please keep a copy of this report for your records. When submitting additional information, include the MassDEP Incident Number from this report.

MassDEP Regional Office and EPA Telephone and Fax Numbers:

Northeast Region	Phone: 978-694-3215	Fax: 978-694-3499
Southeast Region	Phone: 508-946-2750	Fax: 508-947-6557
Central Region	Phone: 508-792-7650	Fax: 508-792-7621
Western Region	Phone: 413-784-1100	Fax: 413-784-1149
EPA Contact	Phone: 617-918-1870	Fax: 617-918-0870
DEP 24-hour emergency	Phone: 888-304-1133	

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Appendix C: Checklist for Proposed Expansion of Sewer District

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Checklist for Proposed expansion of the sewer district:

Name of person proposing the addition of properties _____

As: ☐ An individual ☐ On behalf of multiple property owners (please attach authorization)

☐ On behalf of an organization or association (please attach vote, bylaws authorizing, etc.)

☐ As a government body (attach vote, etc.)

Applicants must qualify under section 1 and score at least seven additional points to be recommended for inclusion into either a Sewer District or Needs Area. Check all boxes below marking any that are not applicable with "N/A". Incomplete forms will be returned

All properties approved for inclusion shall pay a privilege fee and, where appropriate, a betterment assessment covering all costs associated with sewer construction, including engineering, legal, administrative and financing charges. Properties must connect to the sewer within 2 years of approval.

Evaluation Criteria

Required:

1. Capacity: Adequate capacity in sewerage system must be available for proposed additional flow.

- Infrastructure is available to meet added demand as certified by the Sewer Commissioners/DPW ____
- If within SSWWTF, capacity has been accounted for in Removal/Addition Baseline as certified by the Sewer Commissioners/DPW ____
- Infrastructure is not available to meet demand or baseline units not available-**DISQUALIFIED**
Please consult with Sewer Commissioners/DPW to discuss remedial action.

Elective:

2. Failed Septic system: Property must already be developed and have evidence of no feasible replacement. Property owner must demonstrate hardship related to conditions below (maximum of three points):

- Soil Type: Udipsamments-Beaches-Pawtucket, Berryland +1
- Groundwater: Between 0-5 feet below surface +1
- Wetlands: Wetlands within 100 feet of property +1

3. Land Use: Properties must be evaluated in accordance with the following zoning and land use criteria (maximum of five points):

- Lot size: Less than 40,000 square feet +1
- Zoning: Lot is less than or 150% of minimum lot size requirement. +1
- Overlay Districts: Town +1

Public Wellhead Recharge +1
Harbor +1

4. Wellhead: (one point maximum)

- Proximity to Public wellhead less than 500 feet +1

5. Special Consideration: (four point maximum)

The Sewer Commissioners or Board of Selectman, acting in their capacity as the Sewer Commissioners, may grant up to four (4) points to an applicant or group of applicants based upon the following criteria:

- (1) Evidence of severe economic hardship related to environmental conditions associated with the soils, topography, existence of wetland networks, or other condition resulting in the ongoing failure of septic systems. Evidence shall include but not be limited to reports of Registered sanitarian, civil engineer, or other specialist. (+1)
- (2) Subject property or groups of properties located between or surrounded by identified sewer district and/or needs areas. (+1)
- (3) For properties located in the Country Overlay District, voluntary reduction of development potential directly related to the extension of public sewerage may be granted. Individual properties that offer the following restrictions to the Town or County of Nantucket or dedicate a conservation restriction held by an authorized entity may be awarded points in accordance with the following:
 - (a) A lot that exceeds 150% of the minimum area required by the zoning district in which it is located in and agrees to restrict all further division, except for minor lot line adjustments that will not result, directly or indirectly, in the creation of new buildable lots, as approved by the Sewer Commissioners (+1);
 - (b) A lot that exceed 200% of the minimum area required by the zoning district in which it is located in and agrees to rezoning if applicable (+2)
 - (c) Elimination of a second dwelling if otherwise allowed (+2)
 - (d) Restriction in the size and total bedrooms of a second dwelling to no more than 1,000 gross square feet of living space (not including garage or mechanical space) and two (2) bedrooms (+1)
 - (e) Limitation of total bedrooms on subject lot to no more than currently allowed by existing approved septic design. (+2)
 - (f) Limitation of total ground cover to maximum allowed by zoning for a minimum sized lot where lot exceeds 150% of minimum size lot (+1)
Example: 30,000 square foot lot located in a Residential 2 (R-2) zoning district is 150% the minimum lot size of 20,000 square feet. Allowable ground cover is currently 12.5% of the land area or $(30,000 \times 0.125 =) 3,750$ square feet. Reduction of total ground cover to 2,500 square feet $(20,000 \text{ square foot minimum lot size} \times 12.5\%)$
 - (g) A dedication of a portion of land for conservation purposes, dedication of building envelopes or other restrictions to an organization authorized to receive and enforce such restriction that reduce the net impact of future development impact to the waste collection system by at least 30%. (+1 or +2)
- (4) A proposal that (i) documents compliance with all of the above three criteria, (ii) demonstrates a threat to public health and welfare and (iii) contains a comprehensive strategy to address a problem affecting more than two adjacent properties (+1)

Signature of owner/authorized representative

Date

.....
(do not write below this line-official use only)

Date Received _____

Complete__ Incomplete__ returned _____.
(date)

Forwarded on _____.
(date)

Sewer Commission Clerk

1. Failed Septic: Total Points _____ of 3 _____
Approved: Board of Health Date

2. Land Use: Total Points _____ of 5 _____
Approved: Planning Office Date

3. Wellhead: Total Point _____ of 1 _____
Approved: Wannacomet Water Company Date

4. Special: Total Points _____ of 4 _____
Approved: Sewer Commissioners Date

TOTAL: _____ Points of 13 possible.

I recommend/do not recommend inclusion of the properties.

Chairman: Sewer Commissioners Date

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Appendix D: Application for Permit for Sewer Extension

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Town Of Nantucket Sewer Department

Application for Permit for Sewer System Extension, Connection, or Industrial Wastewater

Town Use Only:

Permit Number _____

Application Date: _____

The original of the transmittal form and this application, signed by the appropriate municipal official, should be submitted along with one copy to the Sewer Department. The signature of the design engineer or other agent will be accepted only if accompanied by a letter of authorization. A copy of the transmittal form shall be sent to the Board Of Health.

If the project includes sewers, pumping stations, force mains, or siphons, construction plans must be submitted with the application.

If additional space is required to properly answer any questions, please attach additional sheets and refer to the attachments in the space provided.

A. Applicant Information

1. Name and Address of Applicant: MAP _____ PARCEL _____
- Name _____
- Street address _____
- City/Town _____ Zip Code _____
- Telephone Number (include area code and extension) _____ E-mail address (required) _____
2. Name of Sewer System Owner:
- Name _____
- Municipality or Sewer District _____
- Department _____

B. Project Information

1. Type of Project: ☐ Sewer Extension ☐ Sewer Connection ☐ Industrial Connection
2. Number of Residences to be served: _____
3. Number of Bedrooms: _____



Town Of Nantucket Sewer Department

Application for Permit for Sewer System Extension, Connection, or Industrial Wastewater

Permit Number _____

Town _____

B. Project Information (Continued)

4. Industrial establishment to be served:

a.

Name

Address

Type of Establishment

Design Flow

5. Design Flow:

Sewage

Gallons per day

Industrial Wastes

Gallons per day

Total

Gallons per day

6. Location, Length, Size and Capacity of Sewers to be Connected to the existing system (attach sketch):

a.

Name of Street

Length of Sewer

Size of Sewer

Flow Full Capacity

b.

Name of Street

Length of Sewer

Size of Sewer

Flow Full Capacity

c.

Name of Street

Length of Sewer

Size of Sewer

Flow Full Capacity

7. Location, Length, Size and Capacity of Pumping Stations to be Connected to the existing system:

a.

Pump Station Location

Number of Pumps

Pump Size

Pump Capacity

b.

Pump Station Location

Number of Pumps

Pump Size

Pump Capacity



Town Of Nantucket Sewer Department

Application for Permit for Sewer System Extension, Connection, or Industrial Wastewater

Permit Number _____

Town _____

B. Project Information (continued)

8. General Description of Sewers and Pump Stations within the existing sewer system which will transport the flow from the proposed sewer extension or connection to the receiving Wastewater Treatment Facility. If the sewer extension or connection includes a privately owned pump station, the application must include documentation detailing plans for the continual operation, maintenance, financial assurance for emergency repair and long-term replacement of the privately owned pump station.

9. Receiving Wastewater Treatment Facility:

Name _____

Average Daily Flow _____

Million gallons per day

Design Flow _____

Million gallons per day

10. Does the discharge contain any industrial waste? ☐ Yes ☐ No

If yes, list any pollutants which you know or have reason to believe are discharged or may be discharged. For every pollutant you list, please indicate its approximate concentration in the discharge and any analytical data in your possession which will support your statement. Additional wastewater analysis may be required as part of this application.

Pollutant

Concentration

Analytical Data

_____	_____	_____
_____	_____	_____
_____	_____	_____

11. Does the discharge contain any industrial waste containing substances or materials which could harm the sewers, wastewater treatment process, or equipment; have an adverse effect on the receiving water; or could otherwise endanger life, limb, public property, or constitute a nuisance?

☐ Yes ☐ No



Town Of Nantucket Sewer Department

Application for Permit for Sewer System Extension, Connection, or Industrial Wastewater

Permit Number _____

Town _____

B. Project Information (continued)

12. Do the wastewaters receive any pretreatment prior to discharge?

☐ Yes ☐ No

If yes, provide detailed description.

13. List, in descending order of significance, the four (4) digit standard industrial classification (SIC) Codes which best describe the facility producing the discharge in terms of the principal products for services provided. Also, specify each classification in words.

SIC Code

Specify

A. _____

14. Is the Proposed Discharge Consistent with Existing Sewer Use Regulations?

☐ Yes ☐ No

15. Is there a site of historic or archeological significance, as defined in regulations of the Massachusetts Historical Commission, 950 CMR 71.00, which is in the area affected by the proposed extension or connection?

☐ Yes ☐ No

16. Does this project require a filing under 301 CMR 11.00, the Massachusetts Environmental Policy Act?

☐ Yes ☐ No

If yes, has a Filing been made?

☐ Yes ☐ No

17. Name and Address of Mass. Registered Professional Engineer Designing Proposed System:

Name

Street

City/Town

Zip Code

Telephone Number

Mass. P.E. Number



Town Of Nantucket Sewer Department

Application for Permit for Sewer System Extension, Connection, or Industrial Wastewater

Permit Number _____

Town _____

C. Certification

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment of knowing violations."

(I will be responsible for publication of public notice of the applicable permit proceedings identified under 314 CMR 2.06(1)(a) through (d).)

Printed Name of Applicant _____

Title _____

Signature of Applicant _____

Date Signed _____

Name of Preparer _____

Title _____

Phone Number _____

D. General Conditions

1. General Conditions

- a. All discharge authorized herein shall be consistent with the terms and conditions of this permit and the approved plans and specifications. The discharge of any wastewater at a level in excess of that identified and authorized by this permit shall constitute a violation of the terms and conditions of this permit. Such a violation may result in the imposition of civil and/or criminal penalties as provided for in Section 42 of the State Act.
- b. After notice and opportunity for a hearing, this permit may be modified, suspended, or revoked in whole or in part during its term for cause including, but not limited to, the following:
 - (1) Violation of any terms or conditions of the permit;
 - (2) Obtaining a permit by misrepresentation or failure to disclose fully all relevant facts; and
 - (3) A change in conditions or the existence of a condition which requires either a temporary or permanent reduction or elimination of the authorized discharge.
- c. In the event of any change in control or ownership of facilities from which the authorized discharges originate, the permittee shall notify the succeeding owner or operator of the existence of this permit by letter, a copy of which shall be forwarded to the Director. Succeeding owners or operators shall be bound by all the conditions of this permit, unless and until a new or modified permit is obtained.



Town Of Nantucket Sewer Department

Application for Permit for Sewer System Extension, Connection, or Industrial Wastewater

Permit Number _____

Town _____

D. General Conditions (continued)

- d. The issuance of this permit does not convey any property rights in either real or personal property, or any exclusive privileges; nor does it authorize or relieve the permittee of any liability for any injury to private property or any invasion of personal rights; nor any infringement of Federal, State, or local laws or regulations; nor does it waive the necessity of obtaining any local assent required by law for the discharge authorized herein.
- e. The provisions of this permit are severable, and the invalidity of any condition or subdivision thereof shall not make void any other condition or subdivision thereof.
- f. All information and data provided by an applicant or a permittee identifying the nature and frequency of a discharge shall be available to the public without restriction. All other information (other than effluent data) which may be submitted by an applicant in connection with a permit application shall also be available to the public unless the applicant or permittee is able to demonstrate that the disclosure of such information or particular part thereof to the general public would divulge methods or processes entitled to protection as trade secrets in accordance with the provisions of M.G.L. c.21, s.27(7). Where the applicant or permittee is able to so demonstrate, the Director shall treat the information or the particular part (other than effluent data) as confidential and not release it to any unauthorized person. Such information may be divulged to other officers, employees, or authorized representatives of the Commonwealth or the United States Government concerned with the protection of public water or water supplies.
- g. Transfer of Permits
 - (1) Any sewer system extension or connection permit authorizing an industrial discharge to a sewer system is only valid for the person to whom it is issued, unless transferred pursuant to 314 CMR 7.13. Such permits shall be automatically transferred to a new permittee if:
 - A. The current permittee notifies the Director at least 30 days in advance of the proposed transfer date; and
 - B. The notice includes a written agreement between the existing and new permittee containing a specific date for transfer of permit responsibility, coverage, and liability between them.
 - (2) Any sewer system extension or connection permit not subject to 314 CMR 7.13(1) automatically transfers to a subsequent owner, operator, or occupant.

2. Special Conditions



Town Of Nantucket Sewer Department

Application for Permit for Sewer System Extension, Connection, or Industrial Wastewater

Permit Number _____

Town _____

E. Approval Recommended

Signature and Title Sewer Department:

Printed Name of Official

Title

Phone Number

Signature

Date Signed

Signature and Title Planning Department:

Printed Name of Official

Title

Phone Number

Signature

Date Signed

Signature and Title Board of Health:

Printed Name of Official

Title

Phone Number

Signature

Date Signed

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